# SUBJECT INDEX

Adeno-associated virus (AAV)

#### intrabodies and, 265-66 AGR signal Adenosine-5'-phosphosulfate cell-cell communication in Abcisic acid kinase Gram-positive bacteria eubacterial carotenoid and sulfur assimilation in and, 545-47 biosynthesis and, 634 filamentous fungi and AIDS, see Acquired ABC transporter protein yeast, 80 immunodeficiency syndrome Adenosine triphosphate (ATP) nonfusogenic pathogen Alanine vacuoles and, 441 nonfusogenic pathogen disulfide bonds and, 181, 194 Abf1 transcription factor vacuoles and, 421, 439, Alcaligenes PC-1 eubacterial carotenoid DNA replication in yeast and, Pseudomonas TOL plasmid biosynthesis and, 636, 640. catabolic operons and, 341 644 Accessory genes Adhesins cell-cell communication in Alcohol dehydrogenase I Gram-positive bacteria mucosal antigen-antibody intrabodies and, 259 and, 544-47 interactions and, 313-15 Aldolases nonfusogenic pathogen aldol addition reactions, Accessory proteins Pseudomonas TOL plasmid vacuoles and, 419 287-88, 298, 301 catabolic operons and, Adjuvants 2-deoxyribose-5-phosphate 360, 366 mucosal antigen-antibody aldolase, 301-3 interactions and, 312-32 Acetobacter pasteurianus DHAP-dependent Adonixanthin azasugars, 292-94 enantiopure epoxides and. 516-17 eubacterial carotenoid chemoenzymatic Acetogenium kivui biosynthesis and, 645 applications, 290 Adsorbable organic halogens history of research, 31 disaccharides, 290-92 general background, 288-90 Acetyl coenzyme A organohalogen biosynthesis by monosaccharides, 290-92 nonfusogenic pathogen synthetic applications, vacuoles and, 449 Basidiomycetes and, N-Acetylneuraminic acid aldolase 375-78 290-92 and pyruvate and Aedes albopictus thiosugars, 292-94 alphavirus and, 582 glycine-dependent, 303 phosphoenolpyruvate, 295-98 Aerobic chemosynthesis introduction, 286-87 O-Acetylserine history of research, 25 ketol and aldol transfer Aerosols and sulfur assimilation in reactions N-acetylneuraminic acid filamentous fungi and mucosal antigen-antibody yeast, 73, 75, 80 interactions and, 331 aldolase, 295-98 3-deoxy-D-manno-2-Acidification A factor cell-cell communication in octulosonate aldolase, nonfusogenic pathogen vacuoles and, 416-17, 425, Gram-positive bacteria 298-99 430, 434, 438-39 and, 556 3-deoxy-D-manno-2-African green monkey kidney cells octulosonate 8-phosphate Acquired immunodeficiency syndrome (AIDS) rotaviruses and, 239 synthetase, 298-99 intrabodies and, 257, 274-76 2-keto-3-deoxy-Agaricus spp. phosphogluconate organohalogen biosynthesis by RNA virus fitness and, 169 Basidiomycetes and, aldolase, 300 Actin 379-80, 390 NeuAc synthase, 295-98 nonfusogenic pathogen vacuoles and, 417, 421 Agrobacterium aurantiacum overview, 294, 300-1 transaldolases, 305 Activation eubacterial carotenoid biosynthesis and, 635-36, transketolases, 304-5 DNA bending in transcription and, 593 640, 644, 652 Algae Agrobacterium tumefaciens eubacterial carotenoid Active penetration nonfusogenic pathogen eubacterial carotenoid biosynthesis and, 629, 633 vacuoles and, 420 biosynthesis and, 642, 652 ali genes cell-cell communication in Adaptibility Agrocybe spp. organohalogen biosynthesis by RNA virus fitness and, 164-67 Gram-positive bacteria

Basidiomycetes and, 380

and, 537

Aliphatic compounds chlorinated organohalogen biosynthesis by Basidiomycetes and. 375, 379-84 Alkaline phosphatase disulfide bonds and, 186, 194 nonfusogenic pathogen vacuoles and, 431 alk gene enantiopure epoxides and, 495 Alkylbenzoates Pseudomonas TOL plasmid catabolic operons and, 341.347-48 All-or-none reassortment rotaviruses and, 236 Alphavirus apoptosis and persistence induced by apoptosis induction, 575-76 apoptosis regulation, 568-75 bcl-2 gene, 569-71 caspases, 571-72 cellular inhibitors, 579-80 iap proteins, 573-74 ICE-family proteases, 571-72 introduction, 566 neurovirulence, 580-81 overview, 566-75, 581-83 Sindbis virus-induced disease, 568, 577-83 tumor necrosis factor receptor family, 574-75 viral replication, 566, 568 history of research, 25-26, 29, Amanita spp. organohalogen biosynthesis by Basidiomycetes and, 380 α-Amanitin trypanosomal protein coding genes and, 463, 471 ami genes cell-cell communication in Gram-positive bacteria and, 536-37 Amino acids chlorinated non-protein organohalogen biosynthesis by Basidiomycetes and, 382-83 disulfide bonds and, 180-81, 183, 185, 188-91, 194-95 nonfusogenic pathogen vacuoles and, 419, 441, 445-47 RNA virus fitness and, 160,

165-68

filamentous fungi and yeast, 73, 75, 80-90, 93 Amphibians eubacterial carotenoid biosynthesis and, 629, 634 Amplification DNA bending in transcription and, 612-14 Anabaena sp eubacterial carotenoid biosynthesis and, 635, 649-51 Antibody-dependent cellular cytotoxicity mucosal antigen-antibody interactions and, 325, 327 Antigen-antibody interactions mucosal surfaces and. 311-32 Animal models alphavirus and, 565 Anisyl metabolites chlorinated organohalogen biosynthesis and, 384-88 Annexins nonfusogenic pathogen vacuoles and, 417-18, 425 Anoxygenic photosynthetic bacteria eubacterial carotenoid biosynthesis and, 629. 634-40 Anthraquinones chlorinated organohalogen biosynthesis and, 394 Anthropogenic organohalogens degradation and, 400-5 Antibiotics cell-cell communication in Gram-positive bacteria. 527, 555-56 Xenorhabdus and Photorhabdus, 46 Antisense RNA intrabodies and, 258

Apoptosis

app operon

APS kinase

alphavirus and, 565-83

cell-cell communication in

and sulfur assimilation in

yeast, 73, 80

Arabidopsis thaliana

Gram-positive bacteria

filamentous fungi and

intrabodies and, 275

and, 540

rotaviruses and, 231

and sulfur assimilation in

DNA replication in yeast and, 130 and sulfur assimilation in filamentous fungi and yeast, 79 ara genes DNA bending in transcription and, 606-7 Arhovinises RNA virus fitness and, 159 Architecture promoter DNA bending in transcription and, 593, 603-9, 619 Pseudomonas TOL plasmid catabolic operons and, 359-63 Arenaviruses RNA virus fitness and, 152-53 Arginine RNA virus fitness and, 166-67 Armillaria spp. organohalogen biosynthesis by Basidiomycetes and, 377-78, 381, 392 Aromatic hydrocarbons Pseudomonas TOL plasmid catabolic operons and, 341-45 Aromatic metabolites chlorinated organohalogen biosynthesis and, 384-96 Aromatic sulfate esters and sulfur assimilation in filamentous fungi and veast, 75-76 Artemisinin Plasmodium hemoglobin degradation and, 114 Arthrobacter sp. enantiopure epoxides and, 504 Aspartate disulfide bonds and, 185 intrabodies and, 263-64 RNA virus fitness and, 166-67 Aspergillus mycelia and sulfur assimilation in filamentous fungi and veast, 76 Aspergillus nidulans and sulfur assimilation in filamentous fungi and yeast, 73-76, 79-81, 87, 89-90, 93-94 Aspergillus niger enantiopure epoxides and, 499, 502, 510-12 Assortment signals

rotaviruses and, 249-50

Astaxanthin eubacterial carotenoid biosynthesis and, 645 AT-3 cells alphavirus and, 577-82 Atenolol enantiopure epoxides and, 495 **ATPase** nonfusogenic pathogen vacuoles and, 418, 425, 435, 439 ATP sulfurylase and sulfur assimilation in filamentous fungi and yeast, 73, 77-80 Atrazine organohalogen biosynthesis by Basidiomycetes and, 404 Attachment parasite nonfusogenic pathogen vacuoles and, 416, 419-24 Autocrine cycles cell-cell communication in Gram-positive bacteria and, 553-55 Autonomously replicating sequence (ARS) elements DNA replication in yeast and, 128-29, 131 Autophagosome nonfusogenic pathogen vacuoles and, 441 5-Azacytidine RNA virus fitness and, 164 Azasugars DHAP-dependent aldolases and, 292-94 Azotobacter sp. DNA bending in transcription and, 610 Azotobacter vinelandii disulfide bonds and, 187

## B

Bahesia sp.

hemoglobin degradation and, 107

Bacillus brevis disulfide bonds and, 187

Bacillus megaterium enantiopure epoxides and, 494, 508

Bacillus sp.
DNA bending in transcription and, 615

Bacillus stearothermophilus biosynthesis and, 63 640

bcl-2 gene alphavirus and, 565, 569

bcl-x<sub>L</sub> gene alphavirus and, 565

B-cyclin kinase

DNA replication in yeasi 125, 133–35, 137–3 bdb gene disulfide bonds and, 187

Bdellovibrio sp.

history of research, 28

DNA bending in transcription

and, 601

cell-cell communication in Gram-positive bacteria and, 530-31, 540-45 DNA bending in transcription and, 598, 601, 608 Bacillus thuringiensis alphavirus and, 571 Bacterial interspersed mosaic elements DNA bending in transcription and, 618 Bacteriochlorophyll eubacterial carotenoid biosynthesis and, 630-31 Bacteriocins cell-cell communication in Gram-positive bacteria and, 532-34 Bacteriophage intrabodies and, 261 Bacteriophage OB RNA RNA virus fitness and, 158 Bacteroides fragilis disulfide bonds and, 186 Baeospora spp. organohalogen biosynthesis by Basidiomycetes and, 381 bak genes alphavirus and, 565 Bald phenotype cell-cell communication in Gram-positive bacteria and, 557 Barophilic bacteria history of research, 22-24 Basidiomycetes organohalogen biosynthesis and, 375-406 Bathymodiolus sp. history of research, 25 hax genes alphavirus and, 565 B cells mucosal antigen-antibody interactions and, 331 bch genes eubacterial carotenoid biosynthesis and, 636-37, 640 bcl-2 gene alphavirus and, 565, 569-71 hcl-xt gene alphavirus and, 565 B-cyclin kinase DNA replication in yeast and, 125, 133-35, 137-38, 144

Bacillus subtilis

Beauveria spp. enantiopure epoxides and, 502, 511-12 Beggiatoa sp. history of research, 27, 29 Benzene Pseudomonas TOL plasmid catabolic operons and, 342 Benzoate Pseudomonas TOL plasmid catabolic operons and, 341, 346 Benzyloxycarbonyl-Phe-Arg-CH<sub>2</sub>F Plasmodium hemoglobin degradation and, 116 BHK cells alphavirus and, 581-82 Bicistronic expression vector intrabodies and, 265-66 Biocatalytic approaches enantiopure epoxide synthesis and, 491-18 Biodiversity organohalogen biosynthesis by Basidiomycetes and, 378 Biosynthesis genes eubacterial carotenoid biosynthesis and, 634-51 Biotechnology eubacterial carotenoid biosynthesis and, 629, 651-52 Biotransformation organohalogen biosynthesis by Basidiomycetes and, 398-400 BiP molecular chaperone intrabodies and, 263-64 Birds eubacterial carotenoid biosynthesis and, 629, 634 Bjerkandera spp. organohalogen biosynthesis by Basidiomycetes and, 376-78, 381, 386, 390 Bleachery effluent organohalogen biosynthesis by Basidiomycetes and, 375, 401 Boletus spp. organohalogen biosynthesis by Basidiomycetes and, 380 Bone marrow intrabodies and, 261 Borrelia burgdorferi nonfusogenic pathogen vacuoles and, 423

Bottleneck events

158-59

RNA virus fitness and, 151,

Bovine pancreatic trypsin inhibitor Basidiomycetes and, 379\_80 disulfide bonds and, 190-93 Canthaxanthin Bradyrhizobium japonicum eubacterial carotenoid disulfide bonds and, 195 biosynthesis and, 645 Canvons alphavirus and, 565, 580-83 RNA virus fitness and, 166 Brefeldin A Capped polymers Plasmodium hemoglobin nonfusogenic pathogen vacuoles and, 427 degradation and, 115 Brome mosaic virus Capsid proteins RNA virus fitness and, 167 Bromine Cap structure organohalogen biosynthesis by trypanosomal protein coding genes and, 468-69 Basidiomycetes and, 375 α-Bromoketone Carbohydrates enantiopure epoxides and, 502 simple and complex Bunyaviridae and aldolases and RNA virus fitness and, 152 transketolases, 285-306 y-Butyrolactone car genes cell-cell communication in eubacterial carotenoid Gram-positive bacteria biosynthesis and, 637, and, 555-56 643-44, 647-49 Bystander cells Carotenoids mucosal antigen-antibody eubacterial biosynthesis of interactions and, 325 anoxygenic photosynthetic bacteria, 634-40 bZip proteins and sulfur assimilation in biosynthesis genes, 634-51 filamentous fungi and biotechnological veast, 81-82 applications, 651-52 cyanobacteria, 649-51 distribution, 630-32 functions, 632-34 genetics, 634-51 C6-NBD-ceramide introduction, 630-34 nonfusogenic pathogen localization, 632-34 vacuoles and, 426-27, 429 640-49 Caenorhabditis elegans overview, 630-32 alphavirus and, 571 regulation, 634-51 DNA replication in yeast and, structures, 630-32 130 Cascade loop Caldariomyces fumago Pseudomonas TOL plasmid enantiopure epoxides and, 503, catabolic operons and, 342, 345, 354-63 505-6 Calocybe spp. Caspases organohalogen biosynthesis by alphavirus and, 571-72 Basidiomycetes and, 381 Catabolite repression Pseudomonas TOL plasmid Calyptogena sp history of research, 25 cAMP receptor protein

DNA bending in transcription

and, 603-7

rotaviruses and, 230

Cantharellus spp.

intrabodies and, 274, 276

mucosal antigen-antibody

interactions and, 321

organohalogen biosynthesis by

ca mutants

Cancer

RNA virus fitness and, 160, 166 nonphotosynthetic bacteria, catabolic operons and, 341-65 Catalysis disulfide bonds and, 179 Cathepsin D nonfusogenic pathogen vacuoles and, 420 CAT reporter gene intrabodies and, 268 CCR co-receptors intrabodies and, 275 CD63 protein

Cdc6 protein DNA replication in yeast and, 125 Cell attachment rotaviruses and, 238 Cell-cell communication Gram-positive bacteria and. 527-58 Cell cycle DNA replication in yeast and, 125-26, 128-43, 145 Cell-mediated immunity mucosal antigen-antibody interactions and, 312, 317 Cell surface Xenorhabdus and Photorhabdus, 65-67 Cellular genes alphavirus and, 565 Cellular inhibitors alphavirus and, 579-80 Cellular proteins intrabodies and, 266, 275 Cellular retroelements RNA virus fitness and, 153 Cellulase disulfide bonds and, 197 Central nervous system (CNS) alphavirus and, 582 Cetus procedure enantiopure epoxides and, 504 c-fos promoter DNA bending in transcription and, 609 Chemolithoautotrophic bacteria history of research, 25, 28 Chemotaxis mucosal antigen-antibody interactions and, 313, 325 Chemotherapy intrabodies and, 274 Plasmodium hemoglobin degradation and, 114-17 Chinese hamster ovary (CHO) cells nonfusogenic pathogen vacuoles and, 424, 426, 429 Chiral epoxides enantiopure epoxides and, 491-92, 501 Chlamydia psittaci nonfusogenic pathogen vacuoles and, 419, 427-28, 439, 441, 445

nonfusogenic pathogen

CDC genes

vacuoles and, 420

DNA replication in yeast and,

129-38, 140-41, 143-44

Chlamydia spp. nonfusogenic pathogen vacuoles and, 415–17, 419–21, 424–28, 442–48

Chlamydia trachomatis mucosal antigen-antibody interactions and, 317 nonfusogenic pathogen vacuoles and, 419, 425,

428, 447

Chlorinated compounds organohalogen biosynthesis and, 375, 379-96, 403

Chlorobium sp. history of research, 24

Chloroperoxidase enantiopure epoxides and, 506 Chlorophenols

organohalogen biosynthesis by Basidiomycetes and, 376, 401-3

Chloroquine

Plasmodium hemoglobin degradation and, 114–15

Choline-O-sulfate and sulfur assimilation in

filamentous fungi and yeast, 75–76

DNA replication in yeast and,

Chromatium okenii history of research, 16, 28

Chromosomes

Deinococcus radiodurans and,
203, 215-17

DNA bending and, 614–18 DNA replication in yeast and, 126–28, 131

intrabodies and, 270, 273, 276 Circular viral DNA intrabodies and, 273 cis-acting elements

rotaviruses and, 248-49 Class switch variants

mucosal antigen-antibody interactions and, 330 CLB genes

DNA replication in yeast and, 136–38, 140 Clb5/6(B-cyclin)-Cdc28

DNA replication in yeast and, 125, 136, 139–40, 143–44 "Clean-uppers"

organohalogen biosynthesis by Basidiomycetes and, 376

Clitocybe spp. organohalogen biosynthesis by Basidiomycetes and, 381, 392

CLN genes

DNA replication in yeast and, 136-37, 141

Clonal pools

RNA virus fitness and, 159

Clostridium sp. aldolases and, 296 Coevolution

RNA virus fitness and, 162

Cognate regulators
DNA bending in transcription
and, 593

Coiling phagocytosis nonfusogenic pathogen vacuoles and, 420, 423, 431-32

Collybia spp. organohalogen biosynthesis by

Basidiomycetes and, 381 Combination targets intrabodies and, 274 com genes

cell-cell communication in Gram-positive bacteria and, 535-36, 541

Commensal bacteria mucosal antigen-antibody interactions and, 323

Compensatory mutations RNA virus fitness and, 166 Competence

cell-cell communication in Gram-positive bacteria and, 534-37, 540-44 Competitive exclusion principle

RNA virus fitness and, 160 Competitive selection RNA virus fitness and, 158.

RNA virus fitness and, 158, 160-61

Complement mucosal antigen-antibody interactions and, 313–14, 324, 327

nonfusogenic pathogen vacuoles and, 423 rotaviruses and, 234–35

Complementarity determining regions (CDRs) RNA virus fitness and, 166

Complexity RNA virus fitness and, 164,

167 Conditional-lethal mutations rotaviruses and, 230, 236

Coniophoru spp.
organohalogen biosynthesis by
Basidiomycetes and, 380

Conjugation cell-cell communication in Gram-positive bacteria and, 547-55

Conoid

nonfusogenic pathogen vacuoles and, 421

Constant domain intrabodies and, 259-60

Coordinate regulation

Deinococcus radiodurans and,
217-19

Coprinus spp.

organohalogen biosynthesis by Basidiomycetes and, 380, 390

Copy-choice recombination rotaviruses and, 250

Copy DNA (cDNA) eubacterial carotenoid

biosynthesis and, 650 intrabodies and, 259 RNA virus fitness and, 156

rotaviruses and, 247 Coregulation

DNA bending and, 593–619 Coriolus versicolor

organohalogen biosynthesis by Basidiomycetes and, 377

Cortinarius spp. organohalogen biosynthesis by Basidiomycetes and, 380

Corynebacterium spp. enantiopure epoxides and, 499, 508

Covalency

disulfide bonds and, 181 Coxiella burnetti

nonfusogenic pathogen vacuoles and, 416, 427, 440

Coxsackievirus RNA virus fitness and, 163 CR3 protein

nonfusogenic pathogen vacuoles and, 420 Cristispira sp.

history of research, 30 Crosslinking

mucosal antigen-antibody interactions and, 324 CRP protein

DNA bending in transcription and, 603-7

crt genes eubacterial carotenoid biosynthesis and, 631, 633,

635-53 Crustaceans

eubacterial carotenoid biosynthesis and, 629 Cryptococcus macerans

enantiopure epoxides and, 501

β-Cryptoxanthin eubacterial carotenoid biosynthesis and, 641, 645

Cytoplasm

cell-cell communication in

Crystalline protein genes Gram-positive bacteria eubacterial carotenoid Xenorhabdus and and, 527 biosynthesis and, 632 Photorhabdus, 46, 56-57 disulfide bonds and, 181-82, Deinococcus radiodurans CSP protein 193, 195-97 survival strategies cell-cell communication in intrabodies and, 259, 267-74 coordinate repair of DNA Gram-positive bacteria nonfusogenic pathogen repair functions, 217-19 and, 535 vacuoles and, 431 DNA damage export, 219 Cultured cells rotaviruses and, 226-27 DNA damage-sensitive alphavirus and, 565, 581 Cytoskeleton strains, 211-12 enantiopure epoxides and, 514 nonfusogenic pathogen DNA damage tolerance. Cunninghamella elegans vacuoles and, 417 206-8 enantiopure epoxides and, 500 Cytosol enzymology of DNA repair. Curvature disulfide bonds and, 181, 183 DNA bending in transcription nonfusogenic pathogen genetics, 209-11 and, 593, 598 vacuoles and, 417 habitat, 208-9 cutA gene Cytostome interchromosomal disulfide bonds and, 194 Plasmodium hemoglobin recombination, 215-17 Cyanobacteria degradation and, 100-2 introduction, 204-5 eubacterial carotenoid cvtR promoter organismal characteristics, biosynthesis and, 629, DNA bending in transcription 205-6 649-51 and, 606 phylogeny, 208-9 marine redundant genetic history of research, 27 information, 215 D Cyclins Dense granules DNA replication in yeast and, nonfusogenic pathogen 135-38, 142, 144 DAR vacuoles and, 422, 430 Cycloheximide nonfusogenic pathogen Density nonfusogenic pathogen vacuoles and, 427 cell-cell communication in vacuoles and, 445-47 Daedaleopsis spp. Gram-positive bacteria Cyp18 immunophilin organohalogen biosynthesis by and, 544-46 nonfusogenic pathogen Basidiomycetes and, 381, Deoxy-D-manno-2-octulosonates vacuoles and, 431 functions and, 298-99 CYS3 positive-acting regulatory DAHP 2-Deoxyribose-5-phosphate protein multienzyme synthesis of, 301 aldolase (DERA) and sulfur assimilation in DBF4 gene functions and, 301-3 filamentous fungi and DNA replication in yeast and, Deoxythiosugars yeast, 81-90 136, 138, 140-41 DHAP-dependent aldolases Cysteine Dbf4-Cdc7 and, 293 disulfide bonds and, 179-81, DNA replication in yeast and, Dermocybe spp 183, 188-92, 194-95 125, 136, 139 organohalogen biosynthesis by nonfusogenic pathogen Death effector domain Basidiomycetes and, 380 vacuoles and, 419 alphavirus and, 574 Developmental arrest and sulfur assimilation in nonfusogenic pathogen Decoyinine filamentous fungi and cell-cell communication in vacuoles and, 436-37 yeast, 73, 75, 80-90 Gram-positive bacteria 4,4'-Diapophytoene Cytochalasin D and, 540 eubacterial carotenoid nonfusogenic pathogen Defense biosynthesis and, 632, 635 vacuoles and, 422 immune Dihydroxyacetone phosphate Cytochrome c mucosal antigen-antibody (DHAP) disulfide bonds and, 194-95. interactions and, 311-15 aldolases and, 288-94 198 Degradation Diltiazem Cytokines organohalogen biosynthesis by enantiopure epoxides and, mucosal antigen-antibody Basidiomycetes and, 515-16 375-76 interactions and, 331 Dimerization Cytolytic passages Pseudomonas TOL plasmid intrabodies and, 274 RNA virus fitness and, 161 catabolic operons and. Dimethylallyl pyrophosphate Cytomegalovirus immediate early 344-45 (DMAPP) promoter Degranulation eubacterial carotenoid intrabodies and, 265 mucosal antigen-antibody biosynthesis and, 631

interactions and, 325

Dehydrosqualene

Diols

vicinal

enantiopure epoxides and, rotaviruses and, 246-47 491 DNA amplification Dioxins RNA virus fitness and, 156 DNA bending polychlorinated organohalogen biosynthesis Pseudomonas TOL plasmid by Basidiomycetes and. catabolic operons and. 376 403 341, 360 Disaccharides in transcription DHAP-dependent aldolases CAP. 603-7 and, 290-92 chaperones, 600-2 Discontinuous transcription chromosome organization trypanosomal protein coding and DNA structures, genes and, 465-67 614-18 clues of DNA bending. Diseases RNA virus mutations and, 597-603 152-53, 162-63 consequences of DNA Dismutation bending, 603-14 Plasmodium hemoglobin eukarvotic counterparts, 609 degradation and, 97 functional substitutions Disulfide bonds between DNA-bending cysteine oxidation in vivo, 181, proteins, 602-3 183 introduction, 594-95 disulfide isomerase activity in nature of DNA bending. periplasm, 193 595-97 nucleoid-associated proteins, dsb gene homologues, 187 Dsb proteins, 187-95 615-18 extracellular medium, 197 protein-DNA interactions, global genetic approach 595-98 identifies multiple protein-protein interplay, thiol:disulfide 599-600 oxido-reductases in E. coli, REP sequences, 618 186-87 response-amplification glutaredoxin, 196 mechanisms, 612-14 intrabodies, 260 RIP sequences, 618 introduction, 180-82 σ<sup>54</sup> promoters, 607-8 mucosal antigen-antibody supercoiling and interactions, 315 coregulation of gene oxidation, 195-97 expression, 614-15 periplasm, 196-97 transcriptional promiscuity. protein disulfide isomerase, 609-12 183-84 **DNA** binding protein disulfide isomerase-like and sulfur assimilation in activities in prokaryotes. filamentous fungi and yeast, 82-84, 92-93 184-87 redox proteins, 192-93, 196 DNA cutting and joining reactions thiol:disulfide exchange intrabodies and, 272 reactions in vitro, 187-92 DNA damage export thiol:disulfide oxido-reductase, Deinococcus radiodurans and, 193-94 219 thiol:disulfide reductases, DNA polymerase 193-95 RNA virus fitness and, 164 thioredoxin, 196 DNA relatedness studies Dithiothreitol (DTT) Xenorhabdus and disulfide bonds and, 179-80, Photorhabdus, 50, 52

DNA repair

**DNA** replication

129

in yeast

203, 212-19

186-88, 191, 197

biosynthesis and, 629

organohalogen biosynthesis by

RNA virus mutations and, 161

Basidiomycetes and, 378

eubacterial carotenoid

Diversity

autonomously replicating sequence elements, 129 Cdc6 protein, 134-35 Cdc14 protein, 135 cell cycle control of S phase. 135-39 future research, 144-45 introduction, 126 MCM proteins, 132-34 origin-binding proteins, 127-31 origin recognition complex, 129-31 origins, 127-28 overview, 142-44 prereplicative complexes, 132-35 promoting replication competence, 131-35 proteins, 132-35 replication licensing. 131-32 silencing, 131 S phase, 135-42 Start, 135-39 transcriptional control, 139-42 yeast replication origins, 127-31 DNA transfer Xenorhabdus and Photorhabdus, 57 DNA vaccines mucosal antigen-antibody interactions and, 332 Dolichols eubacterial carotenoid biosynthesis and, 631 dot genes nonfusogenic pathogen vacuoles and, 432-33, 441-42 Double bonds olefinic enantiopure epoxides and, 491, 493 Double mutants rotaviruses and, 235 Double-stranded DNA (dsDNA) rotaviruses and, 232, 248 Double-stranded RNA (dsRNA) rotaviruses and, 225-27 Drift RNA virus fitness and, 168 Drosophila melanogaster Deinococcus radiodurans and, DNA bending in transcription and, 596, 600 DNA replication in yeast and, 130 Drosophilins active transcription factor, organohalogen biosynthesis by Basidiomycetes and, 388, 390–91 Drug resistance RNA virus fitness and, 168 dsb genes

disulfide bonds and, 182, 186–87, 192–95

Dsb proteins disulfide bonds and, 180-82, 187-95

### E

Echinenone eubacterial carotenoid biosynthesis and, 645

Ectothiorhodospiru sp. history of research, 27 Effectors

cell-cell communication in Gram-positive bacteria and, 527

Pseudomonas TOL plasmid catabolic operons and, 342

Electron microscopy nonfusogenic pathogen vacuoles and, 427, 432

Electrophoresis

DNA replication in yeast and,
127

rotaviruses and, 228, 242 Elementary bodies nonfusogenic pathogen vacuoles and, 419–20,

424–27 Enantiopure epoxides double bonds

> heme-dependent monooxygenases, 493–94 ω-hydroxylases, 495–97 methane monooxygenases,

> miscellaneous epoxidations, 497-500

indirect approaches to synthesis, 500 epoxide hydrolases, 507-13 halohydrine epoxydases,

α-haloketones, 501–3 haloperoxidases, 503–7

miscellaneous transformations of epoxide-bearing substrates, 513-17

introduction, 492-93 nucleophile reactions, 492 outlook, 517-18

Encephalitis alphavirus and, 565 Encephalomyocarditis virus (EMCV)

intrabodies and, 265–66 Endocytic cascade nonfusogenic pathogen vacuoles and, 415, 417–19, 425, 428, 430, 433–34

Endoplasmic reticulum (ER) alphavirus and, 578 disulfide bonds and, 179, 183,

185 intrabodies and, 263–64, 275

nonfusogenic pathogen vacuoles and, 420, 429, 440-41, 445, 448-49

Endosomes

mucosal antigen-antibody interactions and, 322

nonfusogenic pathogen vacuoles and, 417-18, 436-37

Energy excess state

Pseudomonas TOL plasmid

catabolic operons and, 364

Energy metabolism nonfusogenic pathogen vacuoles and, 442-44

Enhancers DNA bending in transcription

and, 609
Pseudomonas TOL plasmid
catabolic operons and,
360-62

Enterococcal binding substance cell-cell communication in Gram-positive bacteria and, 547

Enterococcus faecalis cell-cell communication in Gram-positive bacteria and, 530-31, 547-55

Enterotoxin mucosal antigen-antibody interactions and, 332

Entomopathogenic symbioses Xenorhabdus and Photorhabdus, 46

Envelope proteins intrabodies and, 262–66 mucosal antigen-antibody interactions and, 319, 322

env gene intrabodies and, 261-62, 267, 269

Environmental factors disulfide bonds and, 198 RNA virus fitness and, 151, 160, 162 Enzyme-linked immunosorbent

assay (ELISA) rotaviruses and, 242, 244, 246 Enzymes

aldolases, 285–306

Deinococcus radiodurans and, 212–15

DNA bending in transcription and, 600-2

disulfide bonds and, 179 DNA replication in yeast and, 141-42

intrabodies and, 257, 259, 270-72, 275

mucosal antigen-antibody interactions and, 321, 323

Plasmodium hemoglobin degradation and, 108-10 Pseudomonas TOL plasmid

catabolic operons and, 344-45 and sulfur assimilation in

filamentous fungi and yeast, 73, 77–80 transketolases, 285–306

Xenorhabdus and Photorhabdus, 56

Ephestia sp. history of research, 6 Epithelial cells

mucosal antigen-antibody interactions and, 311, 314, 317-22

nonfusogenic pathogen vacuoles and, 416 Epitopes

rotaviruses and, 231
Epoxidation
enantiopure epoxides and, 491

Epoxide hydrolases enantiopure epoxides and, 507-13

Epstein-Barr virus (EBV) mucosal antigen-antibody interactions and, 321

Equilibrium population

RNA virus fitness and, 157 Error catastrophe RNA virus fitness and, 168

Error threshold RNA virus fitness and, 151 RNA virus mutations and, 163-64

Erwinia chrysanthemi disulfide bonds and, 187, 197 Erwinia herbicola

eubacterial carotenoid biosynthesis and, 635–36, 638–42, 644, 646–47, 650–52

Erwinia uredovora eubacterial carotenoid biosynthesis and, 635–36, 638–42, 644, 646–47, 650–52
Erythrocytes
Plasmodium hemoglobin degradation and, 97
Escape mutants intrabodies and, 275–76
Escherichia coli aldolases and, 289, 296, 300–301 disulfide bonds and, 180,

184–87, 193–96, 198 DNA bending in transcription and, 597–98, 601–8, 614–18

enantiopure epoxides and, 496

eubacterial carotenoid biosynthesis and, 640, 642, 644–47, 650–51 intrabodies and, 259, 261

mucosal antigen-antibody interactions and, 332 nonfusogenic pathogen vacuoles and, 424

Pseudomonas TOL plasmid catabolic operons and, 366 RNA virus fitness and, 160 seawater and, 20, 28

and sulfur assimilation in filamentous fungi and yeast, 82 transketolases and, 304

Eubacteria carotenoid biosynthesis and, 629-53

history of research, 29 Eukaryotes

disulfide bonds and, 179-80, 183-84, 193 DNA bending in transcription

and, 609
DNA replication in yeast and,

126, 129–30, 133 intrabodies and, 268 RNA virus fitness and, 166

Eukaryotic sulfate permeases and sulfur assimilation in filamentous fungi and yeast, 77-78

Evolution disulfide bonds and, 180 eubacterial carotenoid

biosynthesis and, 630 RNA virus fitness and, 151–53, 155–56, 160, 163, 166–67,

rotaviruses and, 246–47 Exclusion barrier immune mucosal antigen-antibody interactions and, 314, 317

Excretory immune system mucosal antigen-antibody interactions and, 320-21

Exocytosis nonfusogenic pathogen vacuoles and, 426–27

Exons intrabodies and, 267-68 Extinction

RNA virus fitness and, 153
Extracellular signals
cell-cell communication in

cell-cell communication in Gram-positive bacteria and, 532-34

F

F105 monoclonal antibody intrabodies and, 263–66, 268 Fab antigen binding fragments

Fab antigen binding fragments intrabodies and, 260, 264–66, 270–71, 273, 323–24 Factories

viral RNA virus fitness and, 169 Falcipain

Plasmodium hemoglobin degradation and, 97, 104-7, 110

Farnesyl pyrophosphate eubacterial carotenoid biosynthesis and, 631–32,

Fc fragments

mucosal antigen-antibody interactions and, 313, 323-24

nonfusogenic pathogen vacuoles and, 429

Fd fragments intrabodies and, 270–71 FDP aldolases

sugars and, 288-91, 294
Feline leukemia virus (FeLV)
RNA virus fitness and, 165

Fibroblasts nonfusogenic pathogen vacuoles and, 428

Filaments sulfur assimilation and, 73-94 Thiothrix, 16 Filoviridae

RNA virus fitness and, 152 Fimbriae

Xenorhabdus and Photorhabdus, 66-67

Firing origin

DNA replication in yeast and, 128

Fish eubacterial carotenoid biosynthesis and, 629, 634

Fitness for survival

RNA virus mutations and, 151–69

Fixed markers

nonfusogenic pathogen vacuoles and, 437

FK506

nonfusogenic pathogen vacuoles and, 432

Flagella

Xenorhabdus and Photorhabdus, 66–67

Flammulina spp.

organohalogen biosynthesis by Basidiomycetes and, 381 Flanking sequences

DNA replication in yeast and, 127-28

Flaviviridae

RNA virus fitness and, 152 Flavobacterium sp.

enantiopure epoxides and, 504 eubacterial carotenoid

biosynthesis and, 635–36, 640, 646

Folding helpers in vivo

disulfide bonds and, 179

Fomes spp.

organohalogen biosynthesis by Basidiomycetes and, 381, 386

Fomitopora spp.

organohalogen biosynthesis by Basidiomycetes and, 379-80

Fomitopsis spp.

organohalogen biosynthesis by Basidiomycetes and, 379, 381

Food intake

mucosal antigen-antibody interactions and, 313, 321, 324, 326

nonfusogenic pathogen vacuoles and, 415

Foot-and-mouth disease virus (FMDV) RNA virus fitness and, 159-62,

166-67
Forest litter decomposition organohalogen biosynthesis by Basidiomycetes and

Basidiomycetes and, 375-77

Galerina spp.

Ganoderma spp.

Gene therapy

organohalogen biosynthesis by

organohalogen biosynthesis by

intrabodies and, 257-76

of infectious diseases

Basidiomycetes and, 380

Basidiomycetes and, 380

Fosfomycin Genetic distance Glycine-dependent aldolases enantiopure epoxides and, 500 rotaviruses and, 242-43 overview, 303 Frameshifting Genetic engineering Glycocalyx intrabodies and, 270 mucosal antigen-antibody Xenorhabdus and RNA virus fitness and, 166 interactions and, 330 Photorhabdus, 66-67 D-Fructose nonfusogenic pathogen Glycoproteins multienzyme synthesis of from vacuoles and, 422, 427 intrabodies and, 262-66 rotaviruses and, 231 starch, 306 nonfusogenic pathogen vacuoles and, 420, 427 Functional freezing Genetic markers RNA virus fitness and, 167 rotaviruses and, 229-33 Glycosphingolipids Fungi Gene transfer nonfusogenic pathogen eubacterial carotenoid cell-cell communication in vacuoles and, 426-27 biosynthesis and, 629. Gram-positive bacteria GM1-gangliosides 634 and, 527 nonfusogenic pathogen filamentous Genome vacuoles and, 420 sulfur assimiliation and, DNA replication in yeast and, Golgi complex 126 intrabodies and, 262 Fusin RNA virus fitness and, 151, gor gene intrabodies and, 275 153-57, 164-66 disulfide bonds and, 182 Fusion rotavirus, 225-50 Gram-negative bacteria disulfide bonds and, 179, 183, lysosomal Geometry nonfusogenic pathogen promoter 198 vacuoles and, 415-16, 418, DNA bending in Gram-negative-gamma 428-30, 433-38 transcription and, 593, protobacteria 619 Xenorhabdus and Geotrichum candidum Photorhabdus, 46 G enantiopure epoxides and, 502 Gram-positive bacteria Geranylgeranyl pyrophsophate cell-cell communication in G0 phase eubacterial carotenoid accessory gene regulator cell cycle biosynthesis and, 631-32, system, 544-47 DNA replication in yeast 638-39, 652-53 AGR signal, 545-47 and, 134-35 Geranyl pyrophosphate antibiotic biosynthesis, G1 phase eubacterial carotenoid 555-56 cell cycle biosynthesis and, 631 autocrine cycles, 553-55 DNA replication in yeast Giardia lamblia Bacillus subtilis. and, 125, 129, 131-32, hemoglobin degradation and, 540-44 134-40 109 bacteriocins, 532-34 G2 phase y-butyrolactone, 555-56 Gloeophyllum spp. cell cycle organohalogen biosynthesis by competence, 534-37, 540-44 DNA replication in yeast Basidiomycetes and, 381 conjugation, 547-55 and, 131-32, 143 Glucose density-dependent regulation gag gene Pseudomonas TOL plasmid of virulence, 544-47 intrabodies and, 261-62, 267, catabolic operons and, 346 Enterococcus faecalis. 269 Glucose isomerase 547-55 Gal4 transcription factor DHAP-dependent aldolases extracellular signals, 532-34 DNA replication in yeast and, and, 292 induction, 534-37, 540-44, 129 Glutamate 549-53 Galactose disulfide bonds and, 185 intracellular targets, 547-55 DNA replication in yeast and, intrabodies and, 263-64 introduction, 528-32 Glutaredoxin multiple signaling systems, nonfusogenic pathogen disulfide bonds and, 182, 184, 540-44 vacuoles and, 420 188, 192, 196 nisin, 537-40

Glutathione

Glycerol

Glycine

disulfide bonds and, 183-84,

Pseudomonas TOL plasmid

RNA virus fitness and, 166-67

disulfide bonds and, 181

catabolic operons and, 346

188, 191-92

pAD1, 547-49

547-55

pCF10, 547-49

pheromones, 547-55

pneumococci, 535-37

quorum sensing, 544-45

regulation, 532-34, 537-40

plasmids, 547-49

peptide signals, 540, 542-44,

signaling mechanisms. 545-47 signal transduction, 535-37 sporulation, 540-44 Staphylococcus aureus, 544-47 Streptococcus pneumoniae, 534-37 Streptomyces griseus, 555-56 **GRA** proteins nonfusogenic pathogen vacuoles and, 420, 430-31 Grb3-3 cellular protein intrabodies and, 275 GRP94 molecular chaperone intrabodies and, 263 grx genes disulfide bonds and, 182

## H

eshA gene

3H37 monoclonal antibody intrabodies and, 272 Haemophilus influenzae disulfide bonds and, 187 mucosal antigen-antibody interactions and, 323 Hairpins intrabodies and, 266 Haloaliphatic compounds organohalogen biosynthesis by Basidiomycetes and, 375

disulfide bonds and, 182

organohalogen biosynthesis by

Basidiomycetes and, 380

rotaviruses and, 238

Guanylyltransferase

Gymnophilus spp.

Halogens organohalogen biosynthesis by Basidiomycetes and, 377-78

Halohydrine exoxydases enantiopure epoxides and, 503-7 α-Haloketones

α-Haloketones enantiopure epoxides and, 501-3

Halomethanes organohalogen biosynthesis by Basidiomycetes and, 380, 382

Haloperoxidases enantiopure epoxides and, 503-7

Halophilic bacteria history of research, 9 Hantaviruses RNA virus fitness and, 153 Heavy chain

intrabodies and, 257, 259-60, 265

Heheloma spp.

organohalogen biosynthesis by Basidiomycetes and, 380

HeLa cells alphavirus and, 577-78

intrabodies and, 270 nonfusogenic pathogen vacuoles and, 426 Helicobacter felis

mucosal antigen-antibody interactions and, 317

Hemagglutination rotaviruses and, 238

Heme

eubacterial carotenoid biosynthesis and, 633 Plasmodium hemoglobin

degradation and, 97, 111–15 Heme-dependent

monooxygenases enantiopure epoxides and, 493-94

Hemoglobin metabolism

Plasmodium falciparum and, 97-117

Hemozoin

Plasmodium hemoglobin degradation and, 106, 115 Heparin

nonfusogenic pathogen vacuoles and, 419

Hepatitis RNA virus fitness and, 169 Hepatitis B virus (HBV) RNA virus fitness and, 157 Hepatitis C virus (HCV) RNA virus fitness and, 157 Hepatitis virus E<sub>2</sub> surface-spike

> protein mucosal antigen-antibody interactions and, 319

Hericium spp. organohalogen biosynthesis by Basidiomycetes and, 376, 378, 380

Heterobasidion spp. organohalogen biosynthesis by Basidiomycetes and, 381 Heterogeneity

genetic
RNA virus fitness and, 169
Heteromeric protein complex
and sulfur assimilation in

filamentous fungi and yeast, 92–93 Hexokinases aldolases and, 301

Histidine disulfide bonds and, 181, 188,

191
Histone-like proteins
DNA bending in transcription
and, 593

HIV-1, see Human immundeficiency virus type 1

HL60 cells nonfusogenic pathogen

vacuoles and, 422, 433 HLA-DR

nonfusogenic pathogen vacuoles and, 420 HML genes

DNA replication in yeast and, 131

HMR genes
DNA replication in yeast and,

131 HO gene

DNA replication in yeast and, 140

Hopanoids eubacterial carotenoid biosynthesis and, 631

Host factors

Pseudomonas TOL plasmid catabolic operons and, 341-66

Host-jumping RNA virus fitness and, 152

Human immunodeficiency virus 1 (HIV-1) intrabodies and, 257–58,

261-76 RNA virus fitness and, 162,

165, 168 Humoral immunity

mucosal antigen-antibody interactions and, 312

hup genes DNA bene

DNA bending in transcription and, 616

HU protein

Pseudomonas TOL plasmid catabolic operons and, 366

Hybridomas

intrabodies and, 261, 271–72, 274

mucosal antigen-antibody interactions and, 317

Hydrolysis enantiopure epoxides and, 491

Hydroquinone methyl esters chlorinated organohalogen biosynthesis and, 388-91 Hydrothermal vents interactions and, 313. Basidiomycetes and, deep-sea 324-26, 329 379\_80 history of research, 24-27 IHF protein Insects Hydroxyechinenone Pseudomonas TOL plasmid eubacterial carotenoid eubacterial carotenoid catabolic operons and, biosynthesis and, 629 biosynthesis and, 645 342, 366 Integrases ω-Hydroxylases ilvPG promoter intrabodies and, 270, 272, 274 enantiopure epoxides and, DNA bending in transcription Interchromosomal recombination 495-97 and, 617 Deinococcus radiodurans and. 3-(Hydroxymethyl)-6-Immune reconstitution 203, 215-17 epicastanospermine intrabodies and, 258 Interference NeuAc aldolase and, 298 rotaviruses and, 234-35 Immune response Hydroxyneurosporene mucosal antigen-antibody Interleukins intrabodies and, 267 eubacterial carotenoid interactions and, 311-15, biosynthesis and, 638 330-31 mucosal antigen-antibody Hymenochaete spp. Immunization interactions and, 331 organohalogen biosynthesis by intracellular Internalization Basidiomycetes and, intrabodies and, 257-58, 270 nonfusogenic pathogen Immunoglobulins 379-80 vacuoles and, 416, 418-24 Hypermutagenesis mucosal antigen-antibody Internal ribosome entry site RNA virus fitness and, interactions and, 311, 324, RNA virus fitness and, 166 156-57 326-27 Intrabodies Hypholoma spp. Immunophilins for gene therapy of infectious organohalogen biosynthesis by nonfusogenic pathogen diseases vacuoles and, 431-32 Basidiomycetes and, cellular proteins, 275 377-78, 381, 386, 390 IncA protein combination targets, 274 nonfusogenic pathogen defining terms, 259-60 vacuoles and, 420, 427-28 envelope glycoprotein, Induction 262-66 HIV-1, 261-74 cell-cell communication in iad gene Gram-positive bacteria integrase, 272 cell-cell communication in and, 534-37, 540-44, introduction, 258-59 Gram-positive bacteria 549-53 matrix, 272-73 and, 549 Xenorhabdus and nucleocapsid, 274 iap proteins Photorhabdus, 54-55 Rev. 268-70 alphavirus and, 573-74 Infections reverse transcriptase, 270-72 ICE-family proteases mixed starting material for alphavirus and, 571-72 rotaviruses and, 225, 228, intrabody construction, icm operon 234-40, 246 nonfusogenic pathogen mucosal antigen-antibody Tat, 266-68 vacuoles and, 432-33 interactions and, 311-13, Intracellular neutralization 318, 327-32 IgA mucosal antigen-antibody mucosal antigen-antibody RNA virus fitness and, 151 interactions and, 311, 314, interactions and, 311. rotaviruses and, 239 317-20 313-26, 331-32 Inflammatory reactions Intracellular targeting IgA proteases mucosal antigen-antibody Plasmodium hemoglobin mucosal antigen-antibody interactions and, 311, 313, degradation and, 108-10 interactions and, 321, 323 324-26 Intramolecular recombination Influenza virus rotaviruses and, 250 mucosal antigen-antibody mucosal antigen-antibody Introns interactions and, 324-25, interactions and, 316-18 intrabodies and, 269 RNA virus fitness and, 155, 168 Inversion strategy IgG rotaviruses and, 227, 248 **DHAP-dependent aldolases** intrabodies and, 259, 271 Initiator complex and, 292 DNA replication in yeast and, mucosal antigen-antibody Invertebrates interactions and, 313-14, 128 eubacterial carotenoid 319, 324-25, 327, 329 Inner capsid proteins biosynthesis and, 634 nonfusogenic pathogen mucosal antigen-antibody Iodine vacuoles and, 423, 437 interactions and, 319 organohalogen biosynthesis by IgM Inonotus spp. Basidiomycetes and, 375 mucosal antigen-antibody organohalogen biosynthesis by

Ionizing radiation resistance

Deinococcus radiodurans and. 203

Ischnoderma spp.

organohalogen biosynthesis by Basidiomycetes and, 381,

Isomerization

disulfide bonds and, 179, 189 Isopentenyl pyrophosphate eubacterial carotenoid biosynthesis and, 631

Isoprenoid pyrophosphate eubacterial carotenoid biosynthesis and, 635, 637-38

Isoprenoids

eubacterial carotenoid biosynthesis and, 629

Jacobsen-Katsuki catalysts enantiopure epoxides and, 492 Jannasch HW, 1-40 Jennerian approach rotaviruses and, 242 Jumps RNA virus fitness and, 152. 157-64, 167 lurkat cells

intrabodies and, 273-74

## K

Katsuki-Sharpless method enantiopure epoxides and, 492 KDEL tetrapeptide disulfide bonds and, 185 intrabodies and, 263-64 2-Keto-3-deoxyphosphogluconate aldolase functions and, 300 Ketols

transfer reactions and, 304 Kinetics nonfusogenic pathogen

vacuoles and, 420, 429 RNA virus fitness and, 160 rotaviruses and, 238-39 Kinetoplastida

trypanosomal protein coding genes and, 463

Kiss and run association nonfusogenic pathogen vacuoles and, 419

Klebsiella pneumoniae DNA bending in transcription and, 608, 611

Knockout mutants nonfusogenic pathogen vacuoles and, 421-22

Kraft mills

organohalogen biosynthesis by Basidiomycetes and, 375, 401

Krebs' cycle

Pseudomonas TOL plasmid catabolic operons and, 341, 343-45

Kuehneromyces spp.

organohalogen biosynthesis by Basidiomycetes and, 381

## L

Laccaria spp. organohalogen biosynthesis by Basidiomycetes and, 381 α-Lactalbumin disulfide bonds and, 181

B-Lactamase disulfide bonds and, 181, 191

Lactarius spp. organohalogen biosynthesis by Basidiomycetes and, 380

Lactobacillus plantarum cell-cell communication in Gram-positive bacteria and, 531, 533-34

Lactococcus lactis cell-cell communication in Gram-positive bacteria

and, 530-31, 537, 555 lacZ fusions

DNA bending in transcription and, 614

Lamina propria

mucosal antigen-antibody interactions and, 321-22, 325 331

Laminin

nonfusogenic pathogen vacuoles and, 421 Landscapes

RNA virus fitness and, 161, 167

Lectins

mucosal antigen-antibody interactions and, 314-15

Legionella pneumophila nonfusogenic pathogen vacuoles and, 415-17, 420, 422-23, 429, 431-34, 441-42, 445, 447-49

Leishmania spp.

nonfusogenic pathogen vacuoles and, 416, 423, 440

Lentinellus spp.

organohalogen biosynthesis by Basidiomycetes and, 381

Lentiviruses

intrabodies and, 261 Lepista spp.

organohalogen biosynthesis by Basidiomycetes and, 378, 381, 386

Leucine

disulfide bonds and, 181,

intrabodies and, 263-64 Leucine zipper-DNA binding domain

and sulfur assimilation in filamentous fungi and yeast, 73, 82, 84

Leucoagaricus spp. organohalogen biosynthesis by Basidiomycetes and, 380

Leukocytes

mucosal antigen-antibody interactions and, 311, 313, 324-25

Libraries

disulfide bonds and, 194 eubacterial carotenoid biosynthesis and, 650 intrabodies and, 261

Licensing factor model DNA replication in yeast and, 132

Life cycle

RNA virus fitness and, 158 rotaviruses and, 226-27

Light chain

intrabodies and, 257, 259-61, 265, 270 Lignocellulosic substrates

organohalogen biosynthesis by Basidiomycetes and, 375-77

Linker-scanning substitution analysis

DNA replication in yeast and, 128

Lipid metabolism nonfusogenic pathogen

vacuoles and, 447-49 Liquid vacuoles

history of research, 26 Listeria monocytogenes nonfusogenic pathogen

vacuoles and, 416, 437 Local immunity

mucosal antigen-antibody interactions and, 330

Long terminal repeats (LTRs) intrabodies and, 262, 264, 267

Loops Major histocompatibility complex eubacterial carotenoid Pseudomonas TOL plasmid (MHC) biosynthesis and, 631 catabolic operons and, classes I and II Meningitis 342, 346 nonfusogenic pathogen RNA virus fitness and, 167 vacuoles and, 420, 431 Lrp protein Major outer membrane protein Meripilus spp. DNA bending in transcription nonfusogenic pathogen and, 617-18 vacuoles and, 419, 423 Malaria Lumen mucosal antigen-antibody Plasmodium falciparum and. 97-17 interactions and, 322 nonfusogenic pathogen mal promoters vacuoles and, 431 DNA bending in transcription Luria broth and, 604-5 248\_40 Pseudomonas TOL plasmid Maltose metabolism catabolic operons and, 363 Xenorhabdus and lux genes Photorhabdus, 55 Xenorhabdus and Mammals Photorhabdus, 55-56 eubacterial carotenoid biosynthesis and, 629 Lycopene Met4 protein eubacterial carotenoid Mannose biosynthesis and, 635-36 nonfusogenic pathogen Lymantria dispar vacuoles and, 424 enantiopure epoxides and, MET16 gene Mapping rotaviruses and, 225, 227-29, 235-46 Lymphocytic choriomeningitis virus (LCMV) Marasmius spp. RNA virus fitness and, 163 organohalogen biosynthesis by Lysine Basidiomycetes and, 381. intrabodies and, 263-64 Lysis MAT genes Metabolism nonfusogenic pathogen DNA replication in yeast and, vacuoles and, 420 131 Lysosomal fusion Mating pool nonfusogenic pathogen rotaviruses and, 238 vacuoles and, 416-19, 424-26, 428-30, 434-36 intrabodies and, 272-73 maltose Lysosome-associated membrane MBF heterodimeric factor proteins (LAMPs) DNA replication in yeast and, nonfusogenic pathogen 139-40, 144 vacuoles and, 418-19, 425, MCB element

### M

MA104 cells

433-35

rotaviruses and, 239 DNA replication in yeast and, Macrocystidia spp. organohalogen biosynthesis by Mean-field theory Basidiomycetes and, 381 Macroparasites mucosal antigen-antibody interactions and, 328 Macrophages nonfusogenic pathogen vacuoles and, 416, 422-24, 428, 431-33 Macrotyphula spp.

organohalogen biosynthesis by

Basidiomycetes and, 380

RNA virus fitness and, 160 Measles virus RNA virus fitness and, 156, 168 Plasmodium hemoglobin degradation and, 114 Membrane traffic within endocytic cascade nonfusogenic pathogen vacuoles and, 415, 417-18 Menaquinone

DNA replication in yeast and, 139, 141

interactions and, 330-31

125, 132-34, 140, 143

mucosal antigen-antibody

M cells

MCM genes

mucosal antigen-antibody interactions and, 323 organohalogen biosynthesis by Basidiomycetes and, 380 Messenger RNA (mRNA) DNA replication in yeast and, intrabodies and, 269-70 rotaviruses and, 226-27, 238, and sulfur assimilation in filamentous fungi and yeast, 81, 86-87, 89 trypanosomal protein coding genes and, 463, 467-68 and sulfur assimilation in filamentous fungi and yeast, 92 and sulfur assimilation in filamentous fungi and veast, 93 Metabolic control levels DNA bending in transcription and, 593, 619 eubacterial carotenoid biosynthesis and, 629 hemoglobin Plasmodium falciparum and, 97-117 Xenorhabdus and Photorhabdus, 55 nonfusogenic pathogen vacuoles and, 442-49 organohalogen biosynthesis by Basidiomycetes and, 376 Pseudomonas TOL plasmid catabolic operons and, 342, 363-65 meta pathway operon DNA bending in transcription and, 612

Pseudomonas TOL plasmid

Metazoans

126 Methane monooxygenases

497

Methanogens

Methylene blue

catabolic operons and,

341, 345-54, 363, 366

DNA replication in yeast and,

enantiopure epoxides and,

history of research, 26, 31

degradation and, 114 Methylococcus capsulatus enantiopure epoxides and, 497 Methylococcus organophilum enantiopure epoxides and, 497 Methylosinus trichosporium enantiopure epoxides and, 497, 499 Metoprolol enantiopure epoxides and, 495-96 MIC2 protein nonfusogenic pathogen vacuoles and, 422 Microbial ecology history of research, 36-37 Microbiology history of research, 1-40 Micronemes nonfusogenic pathogen vacuoles and, 422 Microsomes disulfide bonds and, 183 Microspheres biodegradable mucosal antigen-antibody interactions and, 331 **B2-Microtubulin** nonfusogenic pathogen vacuoles and, 420 Mineralization organohalogen biosynthesis by Basidiomycetes and, 398 Mip protein nonfusogenic pathogen vacuoles and, 432 mis5 gene DNA replication in yeast and, 134 Mitochondria nonfusogenic pathogen vacuoles and, 420, 440, 445, 448 DNA replication in yeast and, 125, 132-35, 138 Mixed infection rotaviruses and, 225, 228, 234-40, 246 Molecular biology Deinococcus radiodurans and. 209-11, 215 disulfide bonds and, 179-98 eubacterial carotenoid biosynthesis and, 629-53 intrabodies and, 257-76 RNA virus mutations and, 151-69

rotavirus, 225-50

of sulfur assimilation in

Plasmodium hemoglobin

filamentous fungi and yeast, 73-94 trypanosomal protein coding genes and, 463-82 Xenorhabdus and Photorhabdus, 53-57 Molecular chaperones DNA bending in transcription and, 600-2 intrabodies and, 263-64 nonfusogenic pathogen vacuoles and, 431 Monoclonal antibodies intrabodies and, 261, 263-68. 270, 272 mucosal antigen-antibody interactions and, 312, 316-18, 327, 330 rotaviruses and, 230, 242 Monocytes nonfusogenic pathogen vacuoles and, 423, 431 Monomeric antibodies mucosal antigen-antibody interactions and, 327, 329 Monooxygenases heme-dependent enantiopure epoxides and, 493-94 Monosaccharides DHAP-dependent aldolases and, 290-92 Mosaicism rotaviruses and, 228 Mouse brains alphavirus and, 565, 580-83 M phase cell cycle DNA replication in yeast and, 133-34 MSC-1 cells rotaviruses and, 239 Mucor miehei enantiopure epoxides and, 514 Mucor plumbeus enantiopure epoxides and, 502 Mucar racemasus enantiopure epoxides and, 502 Mucosal surfaces antigen-antibody reactions and IgA, 315-26 immunoglobulins, 326-27 introduction, 312-16 passive antibody for mucosal infections, 327-30 vaccination, 330-32 Mu-Leu-HPh-VSPh Plasmodium hemoglobin degradation and, 116 Muller's ratchet RNA virus fitness and, 158-59

Multimerization Pseudomonas TOL plasmid catabolic operons and, 342 Multiplicity of infection rotaviruses and, 239 Murine antibodies mucosal antigen-antibody interactions and, 328 Murine leukemia virus (MuLV) intrabodies and, 265, 268 Mutagenicity Deinococcus radiodurans and. 203 Mutant spectrum RNA virus fitness and, 157 Mutant swarms quasispecies RNA virus fitness and, 151. 167 Mutations RNA virus, 151-69 Mycena spp organohalogen biosynthesis by Basidiomycetes and. 377-78, 381, 386, 390 Mycobacterium aureum enantiopure epoxides and, 508 Mycobacterium spp. nonfusogenic pathogen vacuoles and, 415-17, 420, 423-24, 434-39, 497, 499 Mycobacterium tuberculosis nonfusogenic pathogen vacuoles and, 423-24, 435-38 Myristilation intrabodies and, 272 Myxococcus xanthus DNA bending in transcription and, 601 eubacterial carotenoid biosynthesis and, 634-37, 640, 642-44, 646-48, 652 Myxoviridae RNA virus fitness and, 152

N18 cells
alphavirus and, 577–78
nac gene
DNA bending in transcription
and, 608
nag genes
DNA bending in transcription
and, 604, 606
Nasopharyngeal carcinoma
mucosal antigen-antibody
interactions and, 321
Neamatoloma f

Nisin

Nocardia spp.

Nocodazole

and, 537-40, 557

497-99, 508-9, 516

vacuoles and, 440

nonfusogenic pathogen

organohalogen biosynthesis by Noncoding regions Basidiomycetes and, 377 rotaviruses and, 232-33 Nef regulatory protein Nonfusogenic pathogen vacuoles intrabodies and, 261-62 acidification, 425, 430, 434, Negative checks DNA bending in transcription amino acid metabolism, 445-46 and, 593 attachment and internalization. Neisseria spp. mucosal antigen-antibody Chlamydia psittaci, 439 interactions and, 323 Chlamydia spp., 419-21, Nematodes soil developmental arrest, 436-37 and Xenorhabdus and Photorhabdus, 46 Neomycin resistance gene intrabodies and, 276 N-NeuAc synthase and pyruvate and phosphoenolpyruvate, 295-98 Neurons alphavirus and, 565, 578, 580, 583 Neurospora crassa eubacterial carotenoid biosynthesis and, 642 and sulfur assimilation in filamentous fungi and yeast, 73-79, 81-82, 84. 86-90, 93-94 Neurospora intermedia and sulfur assimilation in filamentous fungi and yeast, 86 Neurosporene eubacterial carotenoid biosynthesis and, 636, 638 Neurovirulence factors alphavirus and, 580-81 Neutralization antigen rotaviruses and, 238 Neutralization-resistant mutants rotaviruses and, 230-31 Neutralizing molecules intrabodies and, 257 Neutrophils nonfusogenic pathogen vacuoles and, 423 Nifenalol enantiopure epoxides and, 513

early endosomal stage, 436-37 elementary body, 425-26 endocytic cascade, 419, 433-34 endocytic pathway fixed markers, 425 endosomal recycling pathway. 436 energy metabolism, 442-44 exocytosis, 426-27 fixed markers, 437 fluid phase, 425 fusion, 433-35 fusion incompetence, 428-30 fusion inhibition, 438 glycosphingolipids, 426-27 host cell organelles, 439 introduction, 416-17 Legionella pneumophila, 420, 422-23, 431-34, 441-42 Legionella spp., 445, 447-49 lipid metabolism, 447-49 lysosomal fusion, 425-26, 434-38 macrophages, 431 membrane traffic, 417-19 Mycobacterium spp., 420, 423-24, 434-39 parasite proteins, 430-31 parasitophorous vacuole membrane, 430-31 phagosomes, 419, 431-34. 436-37 nucleic acid precursors, 442-44 nutrient acquisition by intravacular pathogens, 442-49 phagosome interactions with endocytic cascade, 417-19 replication-competent vacuole, 424.42 route of entry, 429-30, 437-38 cell-cell communication in Gram-positive bacteria sorting events, 431 Toxoplasma gondii, 420-22, 428-31, 439-41, 444-48 enantiopure epoxides and, traffic markers, 437 vacuolar space, 430-31 virulence factors, 432-33 Nonpermissive condition rotaviruses and, 234-35, 239

438-39

419-24

424-28, 442-48

Nonphotosynthetic bacteria eubacterial carotenoid biosynthesis and, 640-49 NSP proteins rotaviruses and, 238, 248 **NTPase** nonfusogenic pathogen vacuoles and, 430 NTP-binding domain DNA replication in yeast and, Ntr protein Pseudomonas TOL plasmid catabolic operons and, 341 Nuclear factor kB (NF-kB) intrabodies and, 267 Nuclear genes trypanosomal protein coding genes and, 465-69 Nuclear localization signal intrabodies and, 260, 268, 272 Nuclear magnetic resonance (NMR) disulfide bonds and, 184-85 Nucleic acids RNA virus fitness and, 151 Nucleocapsid intrabodies and, 274 Nucleoid-associated proteins DNA bending in transcription and, 615-18 Nucleophiles enantiopure epoxides and, 492 5'-Nucleotidase nonfusogenic pathogen vacuoles and, 420, 431 Nucleotide binding motif DNA replication in yeast and, 130 Nucleotides rotaviruses and, 233 Nucleus cellular intrabodies and, 267-72 Null mutants disulfide bonds and, 186, 193. 195 and sulfur assimilation in filamentous fungi and yeast, 83 Nutrient acquisition eubacterial carotenoid biosynthesis and, 629



Oceanography history of research, 1-40

nonfusogenic pathogen

vacuoles and, 415, 442-44

Olefinic double bonds enantiopure epoxides and, 491, 493

Oligocarbophilic bacteria history of research, 22–24 Oligonucleotide hybridization

probes history of research, 37

Oligopeptide permease cell-cell communication in Gram-positive bacteria and, 527

Oligosaccharides mucosal antigen-antibody interactions and, 315

Oligotrophy history of research, 20 OMP2 protein nonfusogenic pathogen

vacuoles and, 419

Onnia spp.

organohalogen biosynthesis by Basidiomycetes and, 379-80 Open reading frames (ORFs)

eubacterial carotenoid biosynthesis and, 639, 642-44, 648-49 rotaviruses and, 232-33,

642–44, 648–49 rotaviruses and, 232–33, 246–47, 249 Operons

catabolic

Pseudomonas TOL plasmid
and, 341–66
Opp proteins

cell-cell communication in Gram-positive bacteria and, 536–37, 549, 555–56

Opsonization mucosal antigen-antibody interactions and, 313 nonfusogenic pathogen

vacuoles and, 429-30 Optimization quasispecies

RNA virus fitness and, 160-61

DNA replication in yeast and, 129, 134–35, 140 Orcinol methyl esters

chlorinated organohalogen biosynthesis and, 391

Organelles nonfusogenic pathogen vacuoles and, 415, 417, 421, 439-42

Organohalogens
Basidiomycete biosynthesis and
biodegradation of

adsorbable organic halogen screening, 377–78 anisyl metabolites, 384–88 anthraquinones, 394 anthropogenic organohalogen

degradation, 400–5 atrazine, 404 biodiversity of organohalogen-producing capacity, 378

biotransformation, 398–400 chlorinated aliphatic compounds, 379–83 chlorinated aromatic

compounds, 398-400 chlorinated aromatic metabolites, 384-96 chlorolignins in bleach kraft

mill effluents, 401 chlorophenols, 401–3 degradation, 404 dioxins, 403 drosophilins, 388, 390–91

environmental fate, 398–400 environmental significance, 396–98 halomethanes, 380, 382

halomethanes, 380, 382 hydroquinone methyl esters, 388-91

introduction, 376–77 low molecular weight organohalogen production, 378–96 mineralization, 398

miscellaneous chlorinated compounds, 383-84 non-protein amino acids,

382–83 orcinol methyl esters, 391 orsellinate sesquiterpenes,

391–93 oudemansin, 393–94 pentachlorophenol, 401–3

pentachlorophenol, 401-3 polychlorinated biophenyls, 403-4 strobilurin, 393-94

ubiquity of production, 377-78 Origin-binding proteins DNA replication in yeast and,

127–31
Origin recognition complex
(ORC)

DNA replication in yeast and, 125, 128-33

Origins
DNA replication in yeast and,
126-29

Orsellinate sesquiterpenes chlorinated organohalogen biosynthesis and, 391-93

Orthomyxoviruses mucosal antigen-antibody interactions and, 318

Oudemansiella spp. organohalogen biosynthesis by Basidiomycetes and, 381, 386

Oudemansin chlorinated

organohalogen biosynthesis and, 393-94

Outer membranes proteins Xenorhabdus and Photorhabdus, 53-54, 66

Outliers quasispecies

RNA virus fitness and, 167 Oxalic bis-(2-hydroxy-1-

naphthylmethylene) hydrazide

Plasmodium hemoglobin degradation and, 116 Oxidation

disulfide bonds and, 180–83, 188–89, 194–98 Plasmodium hemoglobin

degradation and, 110-11 sulfur and, 24-27 Oxidative degradation organohalogen biosynthesis by

Basidiomycetes and, 376
Oxygen radicals
Plusmodium hemoglobin
degradation and, 97

P

pAD1

cell-cell communication in Gram-positive bacteria and, 547–49 Panaeolus spp.

Panaeolus spp. organohalogen biosynthesis by Basidiomycetes and, 380

Papillomaviruses human

RNA virus fitness and, 157 ParaBAD promoter

DNA bending in transcription and, 606-7 Parainfluenza viruses

mucosal antigen-antibody interactions and, 318

Paramyxoviruses mucosal antigen-antibody interactions and, 318

Parasite proteins nonfusogenic pathogen

Persistence

alphavirus, 565-83

vacuoles and, 420-21. RNA virus fitness and, 153 eubacterial carotenoid 430-31 Peyer's patches biosynthesis and, 645 Parasitophorous vacuole mucosal antigen-antibody Pholiota spp interactions and, 314 membrane organohalogen biosynthesis by nonfusogenic pathogen Phaeolus spp. Basidiomycetes and, 377. vacuoles and, 422, 428-31, organohalogen biosynthesis by 381, 386 439-40, 444-45, 447-49 3'-Phosphoadenosine-Basidiomycetes and, 379, Passive antibody 5'-phosphosulfate mucosal antigen-antibody Phagocytosis and sulfur assimilation in interactions and, 327-30 mucosal antigen-antibody filamentous fungi and PC12 cells interactions and, 314, 323, yeast, 80 alphavirus and, 577 Phospholipase A2 pCF10 nonfusogenic pathogen nonfusogenic pathogen cell-cell communication in vacuoles and, 420, 423, vacuoles and, 422 Gram-positive bacteria 430, 432, 441 Phosphonolpyruvate and, 547-49 Phagolysosomes aldolases and, 294-301 Pc promoter nonfusogenic pathogen Phosphorylation DNA bending in transcription vacuoles and, 416-17, cell-cell communication in and, 612-14 423-24, 429 Gram-positive bacteria Peaks Phagosomes and, 541 nonfusogenic pathogen DNA replication in yeast and, fitness RNA virus fitness and, vacuoles and, 417-20, 125, 136 157-64 431-34, 436-37, 442 Photooxidative protection Penetration-enhancing factor eubacterial carotenoid Phase variation nonfusogenic pathogen Xenorhabdus and biosynthesis and, 629 Photorhabdus, 46, 60-65 vacuoles and, 422 Photorhabdus spp. Penicillium chrysogenum Phellinus spp Xenorhabdus spp. and, 46-67 Photosynthesis and sulfur assimilation in organohalogen biosynthesis by filamentous fungi and Basidiomycetes and, eubacterial carotenoid yeast, 78-80 377-80, 386, 390 biosynthesis and, 629 Penicillium sp. Phenotype Photosynthetic bacteria enantiopure epoxides and, 500 cell-cell communication in history of research, 9, 13, 15, 21 Peniophora spp Gram-positive bacteria phr genes organohalogen biosynthesis by and, 557 cell-cell communication in Basidiomycetes and, 380, disulfide bonds and, 192-95 Gram-positive bacteria 386, 390 DNA replication in yeast and, and, 541-42, 544 Pentachlorophenol 135, 138 Phycomyces blakesleeanus organohalogen biosynthesis by eubacterial carotenoid nonfusogenic pathogen Basidiomycetes and, 375, vacuoles and, 432 biosynthesis and, 634 401-3 RNA virus fitness and, 151, Phylloporia spp. Pe promoter 158, 161, 164 organohalogen biosynthesis by DNA bending in transcription RNA virus mutations and. Basidiomycetes and, 380, and, 612-14 162-63 rotaviruses and, 225, 229-38. Peripheral blood lymphocytes Phylogeny (PBLs) 240, 242, 244-45, 247 Deinococcus radiodurans and, intrabodies and, 261 Phenotypic knock-out 208 Peripheral blood mononuclear intrabodies and, 275 microbial ecology and, 36-37 cells (PBMCs) Xenorhabdus and Phenylisoserine intrabodies and, 265, 270, 272 enantiopure epoxides and, 503 Photorhabdus, 52-53 Periplasm Pheromones Physiological signals disulfide bonds and, 179, cell-cell communication in DNA bending in transcription 182-84, 191-98 Gram-positive bacteria and, 593 Permeability and, 527, 547-55 Phytoene DNA replication in yeast and, Phlebia spp eubacterial carotenoid organohalogen biosynthesis by biosynthesis and, 633, 635 mucosal antigen-antibody Basidiomycetes and, 376, Picomaviruses interactions and, 313, 325 RNA virus fitness and, 152, 166 Phlogistic mediators Permissive condition Pinocytosis rotaviruses and, 234-35, 239 mucosal antigen-antibody nonfusogenic pathogen

interactions and, 325

Phoenicoxanthin

vacuoles and, 420-21

Pits

RNA virus fitness and, 166 deep-sea hydrothermal vents Plants and, 24-25 Pleiotropy euhacterial carotenoid biosynthesis and, 629-30. disulfide bonds and, 192 633 eubacterial carotenoid Plaque transfers biosynthesis and, 637 nonfusogenic pathogen serial RNA virus fitness and, vacuoles and, 442 158-59 Pleurotus spp. Plasma cells organohalogen biosynthesis by mucosal antigen-antibody Basidiomycetes and, 381, interactions and, 322, 329-30 pln genes Plasma membrane cell-cell communication in nonfusogenic pathogen Gram-positive bacteria vacuoles and, 420 and, 534 Plasmepsin Ploidy Plasmodium hemoglobin DNA replication in yeast and. degradation and, 97. 126 103-10, 116 Pm promoter Pseudomonas TOL plasmid Plasmids cell-cell communication in catabolic operons and, 346 Gram-positive bacteria Pneumococcal and, 547-49 competence-stimulating DNA replication in yeast and, peptide 127, 129, 131 cell-cell communication in intrabodies and, 270 Gram-positive bacteria Pseudomonas TOL, 341-66 and, 535 rotaviruses and, 248 Pneumococci Plasmodium falciparum cell-cell communication in hemoglobin metabolism in Gram-positive bacteria artemisinin, 114 and, 535-37 chemotherapy, 114-17 PnifH promoter cytostome, 100-2 DNA bending in transcription digestive vacuole, 100-2, and, 608, 610-11 108-10 Pocketing drugs blocking hemoglobin mucosal antigen-antibody degradation, 116-17 interactions and, 330 falcipain, 104-7, 110 Point mutations heme polymerization, RNA virus fitness and, 159, 163 111-14 rotaviruses and, 231, 233 hemoglobin degradation, pol gene 99-108 DNA replication in yeast and, hemoglobin ingestion, 100-2 intracellular targeting. intrabodies and, 261-62, 267. 108-10 269-70, 272 introduction, 98-99 Polioviruses methylene blue, 114 RNA virus fitness and, 162, 164 oxidative stress, 110-11 Pollutants plasmepsin, 103-10 organohalogen biosynthesis by plasmepsin inhibitors, 116 Basidiomycetes and, PPPP inhibitors, 116-17 375-76 proteases, 102 Polychlorinated biphenyls (PCBs) proteolysis, 108-10 organohalogen biosynthesis by quantitation, 99-100 Basidiomycetes and, 376, quinolines, 114-15 utilization, 99-100 Polycistronic transcription

trypanosomal protein coding

genes and, 467

RNA virus fitness and, 160

Polyclonal antibodies

Plasticity

169

Plate tectonics

RNA virus fitness and, 152,

Polymerase chain reaction (PCR) history of research, 37 RNA virus fitness and, 157, 165 Polymerases RNA virus fitness and, 151, 168 rotaviruses and, 250 Polymeric antibodies mucosal antigen-antibody interactions and, 329 Polymerization Plasmodium hemoglobin degradation and, 97, 106, 111-14 Polymorphisms rotaviruses and, 232 Polypeptides disulfide bonds and, 179 Population dynamics RNA virus fitness and, 153. 157-58, 160-61 por genes disulfide bonds and, 187 Poria spp organohalogen biosynthesis by Basidiomycetes and, 381, Porins nonfusogenic pathogen vacuoles and, 423 **Porphyrins** eubacterial carotenoid biosynthesis and, 633 Positive checks DNA bending in transcription and, 593 Posttranscriptional control trypanosomal protein coding genes and, 467-68 Xenorhabdus and Photorhabdus, 46 ppfA gene disulfide bonds and, 186 ppsR gene eubacterial carotenoid biosynthesis and, 637, 639 Preintegration complex intrabodies and, 271-72 Prephytoene pyrophosphate eubacterial carotenoid biosynthesis and, 631 Prereplicative complexes DNA replication in yeast and, 125, 132-35 prg genes cell-cell communication in Gram-positive bacteria and, 550-53

PRI genes

140

DNA replication in yeast and,

Primer sequences intrabodies and, 261 Procyclic acidic repetitive protein (PARP)

trypanosomal protein coding genes and, 463-64, 476-80 Programmed cell death, see

Apoptosis Prokaryotes

Deinococcus radiodurans and. 203

disulfide bonds and, 179-80. 184\_87

DNA bending in transcription and, 593

Proline

disulfide bonds and, 181, 188, 191, 195

Promiscuity

DNA bending in transcription and, 609-12

Pseudomonas TOL plasmid catabolic operons and, 366

**Promoters** 

DNA bending in transcription and, 593, 603-9, 619 intrabodies and, 264

Pseudomonas TOL plasmid catabolic operons and. 341-42, 350-54, 359-63, 366

rotaviruses and, 248-49 trypanosomal protein coding genes and, 474-77

Proplasmepsin processing protease (PPPP) inhibitors Plasmodium hemoglobin degradation and, 116-17

Proteases

alphavirus and, 571-72 intrabodies and, 270 mucosal antigen-antibody interactions and, 321, 323

Plasmodium hemoglobin degradation and, 97, 102 rotaviruses and, 238

Protein coding genes trypanosomal

RNA polymerase I and. 463-82 Protein disulfide isomerase

disulfide bonds and, 180-81, 183-88, 190, 192-94 Protein-DNA contacts

DNA bending in transcription and, 593, 595-98, 619 Protein folding

disulfide bonds and, 179-80, 185, 192-93, 197-98 Protein kinases

DNA replication in yeast and.

Protein-protein contacts DNA bending in transcription and, 593, 599-600, 619

Proteolysis disulfide bonds and, 185 DNA replication in yeast and, 138

Plasmodium hemoglobin degradation and, 108-10 Protoporphyrin IX

eubacterial carotenoid biosynthesis and, 633 Protozoa

history of research, 6, 27 Provinis

HIV-1 intrabodies and, 271, 273

Provitamin A eubacterial carotenoid biosynthesis and, 629, 634

Ps1 promoter Pseudomonas TOL plasmid catabolic operons and,

342, 359-63 Psathyrella spp. organohalogen biosynthesis by Basidiomycetes and, 380,

Pseudoknots RNA virus fitness and, 166

Pseudomonas aeruginosa disulfide bonds and, 187 enantiopure epoxides and, 496 Pseudomonas putida

aldolases and, 300 DNA bending in transcription and, 602, 608, 610-11 enantiopure epoxides and, 494, 496, 507

Pseudomonas putida TOL plasmid catabolic operons

transcriptional control of accessory proteins, 360 alkylbenzoates, 347-48 aromatic hydrocarbon metabolism, 342-43 cascade loop, 354-63 catabolite repression, 363-65 coordinate expression, 363 DNA bending, 360 enhancer-like sequences. 360-62

enhancer sites, 362 future research, 365-66 meta-cleavage pathway operon, 347-54, 363 Ps1 promoter, 359-63

Pu promoter, 359-63 pWW0, 343-47

 $\sigma^{54}$  recognition site, 359-60 or 70 factor, 350-54

σ<sup>S</sup> factor, 350-54 Tn4651, 343-45

Tn4653, 343-45 toluene metabolism integration into cell

metabolism, 363-65 upper pathway, 363 Xyl regulator, 354-62 XylS regulator, 347-50

Pseudomonas spp. enantiopure epoxides and, 495-96, 499, 504-5, 507-8, 514

Psilocybe spp. organohalogen biosynthesis by Basidiomycetes and, 381

Ps promoter

DNA bending in transcription and, 611-12 Psychrophilic bacteria

history of research, 22-24 puc genes

eubacterial carotenoid biosynthesis and, 637, 640

puf genes eubacterial carotenoid biosynthesis and, 636

Pu promoter DNA bending in transcription

and, 610-12 Pseudomonas TOL plasmid catabolic operons and. 342, 346, 359-63

put genes DNA bending in transcription and, 597-98

pWW0

Pseudomonas TOL plasmid catabolic operons and, 342-66

Pyruvate

aldolases and, 294-301



Quantitative reassortment tests rotaviruses and, 235 Quasispecies

viral

RNA virus fitness and, 151. 157-58, 160-61, 163, 165, 167-68 Quinidine

Plasmodium hemoglobin degradation and, 114

Quinine Plasmodium hemoglobin degradation and, 114 Ouinoline Plasmodium hemoglobin degradation and, 97, 296 114-15 Quorum sensing cell-cell communication in Regulation Gram-positive bacteria and, 527, 544-45 R rab proteins nonfusogenic pathogen vacuoles and, 418, 420, 437 RAMA aldolases and, 288, 290-91. 293, 302 Ramaria spp. organohalogen biosynthesis by 203 Basidiomycetes and, 380, Regulatory genes Rap1 transcrption factor DNA replication in yeast and, Reassortment RNA virus fitness and. 155-56 rotaviruses and, 225, 227-29, 235-46 Receptor-mediated endocytosis nonfusogenic pathogen vacuoles and, 420-21 Reovirus Receptors alphavirus and, 574-75 intrabodies and, 275 Replicases mucosal antigen-antibody interactions and, 311, 314, 323-24 Replication nonfusogenic pathogen vacuoles and, 423-24, 427, Recombination Replication forks RNA virus fitness and, 155-56 rotaviruses and, 227-28 126 Recycling pathway Replication licensing

182-88, 190, 192-98 Replicons Red Queen hypothesis RNA virus fitness and, 168 RNA virus fitness and, 160, Repressing metabolite Reductive dechlorination organohalogen biosynthesis by 364

Basidiomycetes and, 376 re face attack and pyruvate and

nonfusogenic pathogen

disulfide bonds and, 179-80,

vacuoles and, 436-37

endosomal

Redox proteins

phosphoenolpyruvatedependent aldolases.

Regional mutations rotaviruses and, 231

cell-cell communication in Gram-positive bacteria and, 527, 532-34, 537-40, 544.47

eubacterial carotenoid biosynthesis and, 634-51 Pseudomonas TOL plasmid catabolic operons and.

Regulatory cascades DNA bending in transcription and, 593

Regulatory checkpoints Deinococcus radiodurans and,

eubacterial carotenoid biosynthesis and, 634 and sulfur assimilation in filamentous fungi and yeast, 81, 85-86, 90-93

Regulatory proteins intrabodies and, 257-59, 261-62, 266-70, 275 Remote activation

DNA bending in transcription and, 593

rotaviruses and, 227, 229, 234, 247-48

RNA virus fitness and, 164 rotaviruses and, 227

alphavirus and, 566, 568 nonfusogenic pathogen vacuoles and, 424-42

DNA replication in yeast and,

DNA replication in yeast and, 131-32 Replication origins

DNA replication in yeast and, 127-31

Pseudomonas TOL plasmid catabolic operons and.

REP sequences DNA bending in transcription and, 618

Reptiles eubacterial carotenoid biosynthesis and, 634 RER integral membrane

glycoprotein rotaviruses and, 238 Resinicium spp.

organohalogen biosynthesis by Basidiomycetes and, 380 Respiratory syncytial virus

mucosal antigen-antibody interactions and, 317 Response-amplification

mechanisms DNA bending in transcription and, 612-14

Restrictors DNA bending in transcription and, 610 Reticulate bodies

nonfusogenic pathogen vacuoles and, 419-20, 427. 439, 442

Retinal eubacterial carotenoid biosynthesis and, 634 Retinoic acid

eubacterial carotenoid biosynthesis and, 634 Retrotransposition RNA virus fitness and, 154

Retroviruses intrabodies and, 261, 272 RNA virus fitness and, 152, 164

Reverse genetics rotaviruses and, 225, 231, 247-50 Reverse transcriptase

intrabodies and, 270-72, 274-75 RNA virus fitness and, 156, 168

Rev regulatory protein intrabodies and, 259, 261-62, 268-70 RFA genes

DNA replication in yeast and, 140 Rhabdoviruses

RNA virus fitness and, 155 Rhizopus sp. enantiopure epoxides and, 514

Rhodobacter capsulatus disulfide bonds and, 195 eubacterial carotenoid biosynthesis and, 634-39, 642

Rhodobacter sphaeroides eubacterial carotenoid biosynthesis and, 634-40, 642

Rhodococcus spp. adaptive landscapes. enantiopure epoxides and, 498, 167 502, 509 competitive selection, 158, Rhodotorula sp. 160-61 enantiopure epoxides and, disease, 152-53, 162-63 514 emergence, 152-53 error threshold, 163-64 Rhoptries parasitic evolution, 152-53 nonfusogenic pathogen fitness gain, 158-61 vacuoles and, 422, 430, fitness jumps, 157-64, 167 fitness loss, 158-59 Ribonucleotide reductase hypermutagenesis for DNA replication in yeast and, exploration of sequence 141 space, 156-57 molecular mechanisms of Ribosomal RNA (rRNA) history of research, 21, 26 RNA genome variation. trypanosomal protein coding 154-57 genes and, 463, 471-72, Muller's ratchet, 158-59 474-76 mutation and recombination Xenorhabdus and in RNA virus evolution. Photorhabdus, 52-53 155-56 new diseases, 152-53 Ribosomes alphavirus and, 578 new viruses, 152-53 intrabodies and, 263, 265-66, occupation of sequence 270 space, 164-67 nonfusogenic pathogen peaks, 157-64 vacuoles and, 441 phenotype, 162-63 RNA virus fitness and, population dynamics, 153. 166 161 Ribozymes quasispecies, 157-58, intrabodies and, 258 160-61, 168 Riftia sp. RNA genome adaptibility, history of research, 25 164-67 Rickettseae structural and functional nonfusogenic pathogen constraints at RNA and vacuoles and, 416 protein levels, 166-67 RIP sequences ubiquity, 152-53 DNA bending in transcription valleys, 157-64 and, 618 ROP proteins RMK cells nonfusogenic pathogen rotaviruses and, 239 vacuoles and, 420, 422, RNA 440 alphavirus and, 582-83 Rotaviruses intrabodies and, 258-59, 266, assortment signals, 249-50 269, 271, 274 cis-acting elements on mRNA RNA virus fitness and, 156 templates, 248-49 rotaviruses and, 238 evolution, 246-47 RNA polymerase future research, 247-50 Pseudomonas TOL plasmid genetic studies catabolic operons and, gene function, 240-42 341-42, 346, 366 genetic distance, 242-43 rotaviruses and, 226-27, reassortment analysis. 238 240-46 RNA polymerase I vaccination, 242 trypanosomal protein coding genetic system gene transcription and, all-or-none reassortment, 463-82 RNAse A biological phenotypes, 232

complementation, 234-35

230

disulfide bonds and, 183

fitness for survival and

RNA virus mutations

genetically engineered mutants, 231 genetic markers, 229-33 genetic rearrangements, 232-33 genotype, 236 host, 239-40 interference, 234-35 kinetics, 238-39 mapping viral phenotype by reassortment, 236-38 mixed infection, 234-40 multiplicity of infection. 239-40 neutralization-resistant mutants, 230-31 nonpermissive condition. 239 phenotypic mixing, 240 polymorphisms, 232 quantitative reassortment tests, 235 reassortment, 227-29, 235-40 intramolecular recombination, 250 introduction, 226 life cycle, 226-27 reverse genetics, 247-49 RT-PCR RNA virus fitness and, 165 rum1 gene DNA replication in yeast and, 142-43 Russula spp. organohalogen biosynthesis by Basidiomycetes and, 378,

Sabin vaccine mucosal antigen-antibody interactions and, 316 Saccharomyces cerevisiae DNA replication in yeast and, 126, 133 eubacterial carotenoid biosynthesis and, 652 intrabodies and, 259 and sulfur assimilation in filamentous fungi and yeast, 73-80, 84, 90-91, Saccharomyces retrotransposon RNA virus fitness and, 154 SAG proteins conditional-lethal mutations, nonfusogenic pathogen vacuoles and, 421

Sakacins cell-cell communication in Gram-positive bacteria and, 534

Salk vaccine

mucosal antigen-antibody interactions and, 316

Salmonella sp.

DNA bending in transcription and, 601, 615

Salmonella typhimurium

DNA bending in transcription

and, 616 mucosal antigen-antibody interactions and, 317

nonfusogenic pathogen vacuoles and, 416-18, 438

Sanctuaries

viral

RNA virus fitness and, 169 Sarcina ventriculi

history of research, 30

sar genes

cell-cell communication in Gram-positive bacteria and, 545-46

Satellites

RNA virus fitness and, 153 SBF transcription factor

DNA replication in yeast and, 140-41, 144

SC-50083

Plasmodium hemoglobin degradation and, 116 Schistosoma spp.

hemoglobin degradation and, 107-8

Schizophyllum spp.

organohalogen biosynthesis by Basidiomycetes and, 390

Schizopora spp. organohalogen biosynthesis by

Basidiomycetes and, 381 Schizosaccharomyces pombe DNA replication in yeast and,

scon-2 gene

and sulfur assimilation in filamentous fungi and yeast, 86-87

Secretory proteins intrabodies and, 263

Selective pressures RNA virus fitness and, 167-68

Self induction cell-cell communication in

Gram-positive bacteria and, 553-55

Sendai virus mucosal antigen-antibody interactions and, 317–18 Sequence space RNA virus fitness and, 156-57, 164-67

Serine

disulfide bonds and, 188 Serine hydroxymethyltransferases overview, 303

Serotype

RNA virus fitness and, 167 rotaviruses and, 242, 246,

Serpula spp.

organohalogen biosynthesis by Basidiomycetes and, 380

Sex pheromones

cell-cell communication in Gram-positive bacteria and, 553-55

Shigellae

nonfusogenic pathogen vacuoles and, 416

Shigella flexneri

disulfide bonds and, 187 mucosal antigen-antibody interactions and, 317

Shuttling

intrabodies and, 270

si face attack

and pyruvate and phosphoenolpyruvatedependent aldolases,

σ 54 factor

DNA bending in transcription and, 607-8

Pseudomonas TOL plasmid catabolic operons and, 342, 346, 359-60, 366

70 facto

Pseudomonas TOL plasmid catabolic operons and, 341, 346, 350–54, 366

σ<sup>S</sup> factor

Pseudomonas TOL plasmid catabolic operons and, 341, 346, 350-54

Signal integration devices DNA bending in transcription and, 593, 603-9

Signal molecules

cell-cell communication in Gram-positive bacteria and, 527, 532-34, 540-56

Signal transduction cell-cell communication in Gram-positive bacteria

and, 527, 532-37, 540-56 intrabodies and, 266 Xenorhabdus and Photorhabdus, 46

Silencing

DNA replication in yeast and, 131

Silent mutations

RNA virus fitness and, 166 Simian virus 40 (SV40)

intrabodies and, 260, 268 Sindbis virus

apoptosis and disease induced by, 568, 577-83

Single-chain antibodies gene therapy of infectious

diseases and, 257 Single-chain variable region fragment

intrabodies and, 260

SIR3 gene

DNA replication in yeast and, 131

Site-directed mutagenesis intrabodies and, 272 rotaviruses and, 247

rotaviruses and, 247
Six-point mutations
RNA virus fitness and, 159,

163 SNAFL probe

nonfusogenic pathogen vacuoles and, 425

Soft science

newly emerging, 38 Somatic mutations

intrabodies and, 275

Sorting events nonfusogenic pathogen

vacuoles and, 431

Specificity DNA bending in transcription and, 593

S phase cell cycle

> DNA replication in yeast and, 125-26, 128-32, 135-43

Sphingomyelin

nonfusogenic pathogen vacuoles and, 427

Spinal cord

alphavirus and, 582 Spirillum volutans history of research, 7

Sporulation

cell-cell communication in Gram-positive bacteria and, 540-44

srfA gene

cell-cell communication in Gram-positive bacteria and, 544

Staphylococcus aureus

cell-cell communication in Gram-positive bacteria and, 530-31, 544-47 eubacterial carotenoid biosynthesis and, 635, 640, 646-47

Staphylococcus carnosus DHAP-dependent aldolases and, 288

eubacterial carotenoid biosynthesis and, 646-47

Staphylococcus sp. eubacterial carotenoid biosynthesis and, 647

Start G1 decision point DNA replication in yeast and, 125, 135-39

Stationary phase conditions Xenorhabdus and Photorhabdus, 46

Sterna sandwichensis history of research, 4 Sterols

eubacterial carotenoid biosynthesis and, 631

Stochastic generation of mutations RNA virus fitness and.

160 Streptococcus gordonii cell-cell communication in Gram-positive bacteria

and, 531, 535-36 Streptococcus pneumoniae cell-cell communication in Gram-positive bacteria and, 528, 530-31, 533-37

mucosal antigen-antibody interactions and, 323

Streptococcus sanguis cell-cell communication in Gram-positive bacteria and, 530

Streptococcus spp cell-cell communication in Gram-positive bacteria and, 556

DHAP-dependent aldolases and, 289 mucosal antigen-antibody

interactions and, 324 Streptomyces coelicolor cell-cell communication in

Gram-positive bacteria and, 556-57

Streptomyces griseus cell-cell communication in Gram-positive bacteria and, 530, 555-56

eubacterial carotenoid biosynthesis and, 635-36, 640, 646, 649

Streptomyces peucetius cell-cell communication in

Gram-positive bacteria and, 557 Streptomyces spp. eubacterial carotenoid

biosynthesis and, 637, 640. 646 649

Strobilurin chlorinated

organohalogen biosynthesis and, 393-94

Strobilurus spp organohalogen biosynthesis by Basidiomycetes and, 381

Stropharia spp. organohalogen biosynthesis by Basidiomycetes and, 381,

Structural genes intrabodies and, 261 Structural proteins

intrabodies and, 257, 269,

Stylosanthes hamata and sulfur assimilation in filamentous fungi and veast, 78

Subcellular compartments intrabodies and, 257 Subepithelial compartment

mucosal antigen-antibody interactions and, 314 Sugars

simple and complex and aldolases and transketolases, 285-306

Suicide molecules intrabodies and, 259 Sulfur assimilation

in filamentous fungi and yeast adenosine-5'-phosphosulfate kinase, 80 amino acids, 93 aromatic sulfate esters,

75-76 Aspergillus nidulans, 89-90

ATP sulfurylase, 78-80 bZip proteins, 81-82 choline-O-sulfate, 75-76

CYS3 protein, 81-86 cysteine, 80-81 DNA binding, 82-84,

92-93 eukaryotic sulfate permeases, 77-78

genes, 86-87 heteromeric protein complex,

introduction, 74-75 Met4 protein, 92 MET16 gene, 93

92-93

Neurospora crassa, 81, 87-89

3'-phosphoadenosine-5' -phosphosulfate, 80 regulatory genes, 81, 85-86, 90-93

scon-2 gene, 86-87 secondary sulfur sources. 76-77

sulfate activation, 78-80 sulfur circuit, 87-89 sulfur metabolism, 89-90 trans-activation domains, 85 B-transducin, 86-87

Sulfur oxidation history of research, 24-27 Sulfur tuft

organohalogen biosynthesis by Basidiomycetes and, 377

Supercoiling DNA bending in transcription and, 610, 614-15 Suppression efect

disulfide bonds and, 193 Survival

RNA virus mutations and. 151-69

Swi proteins DNA replication in yeast and, 139-41

Symbiotic bacteria Xenorhabdus and Photorhabdus, 46

Syncephalastrum racemosum enantiopure epoxides and, 500 Syncytium

intrabodies and, 262, 264-65 Synechococcus sp eubacterial carotenoid

biosynthesis and, 635, 638, 649-52 Synechocystis sp.

eubacterial carotenoid biosynthesis and, 635, 650 Synergy

mucosal antigen-antibody interactions and, 314

Tachyzoites

nonfusogenic pathogen vacuoles and, 428 Taq polymerase

RNA virus fitness and, 156 TAR region intrabodies and, 266-67

Tat regulatory protein intrabodies and, 259, 261-62, 266-68

Tn4651 Taxonomy Xenorhabdus and Pseudomonas TOL plasmid catabolic operons and, Photorhabdus, 50-51 T cells 343-45 mucosal antigen-antibody TN4653 interactions and, 331 Pseudomonas TOL plasmid tcpG gene catabolic operons and, disulfide bonds and, 187 343-45 Telomeres TOL plasmid DNA replication in yeast and, Pseudomonas, catabolic operons and, 341-66 Tetrahydrolycopene **Toluates** eubacterial carotenoid Pseudomonas TOL plasmid biosynthesis and, 633 catabolic operons and. Tf protein nonfusogenic pathogen Toluene vacuoles and, 420, 425 Pseudomonas TOL plasmid Thermococcus litoralis catabolic operons and. history of research, 29 341-46, 363-65 Thermothrix sp. Topical antibodies history of research, 30 mucosal antigen-antibody Thermotoga neopolitana interactions and, 328 history of research, 29 Topology Thermus thermophilus DNA bending in transcription eubacterial carotenoid and, 617 biosynthesis and, 635, 640, Toxoplasma gondii 645-46 nonfusogenic pathogen Thiobacillus sp. vacuoles and, 415-17, history of research, 28 419-22, 428-31, 439-42, Thiol:disulfide exchange reactions 444-49 disulfide bonds and, 186-95, Traffic markers 198 nonfusogenic pathogen Thiomicrospira sp. vacuoles and, 437 history of research, 28, 31 tra genes Thioploca mats cell-cell communication in history of research, 27, 39 Gram-positive bacteria Thioredoxin and, 549, 551 disulfide bonds and, 180-85. Trametes spp 188-89, 191-92, 194-96 organohalogen biosynthesis by Basidiomycetes and, Thiosugars DHAP-dependent aldolases 376-77, 381, 386 and, 292-94 Transactivation Thiothrix sp. intrabodies and, 266-68 and sulfur assimilation in history of research, 16 Thiovulum sp. filamentous fungi and yeast, 85 history of research, 30 Thorotrast Transaldolases nonfusogenic pathogen aldolases and, 305 vacuoles and, 424, 428 **Transcriptases** rotaviruses and, 227 Threonine disulfide bonds and, 181, 195 Transcription L-Threonine aldolase DNA bending and, 593-619 overview, 303 DNA replication in yeast and, Thymidylate synthase 128-29, 139-42 DNA replication in yeast and, Pseudomonas TOL plasmid catabolic operons and, 141 T lymphocytes 341-66 intrabodies and, 258, 262-66, rotaviruses and, 227, 248 270-71, 273, 276 trypanosomal protein coding mucosal antigen-antibody genes and, 463-82

interactions and, 312

Transcytosis

mucosal antigen-antibody interactions and, 315, 318, 323 Transdominant mutant proteins intrabodies and, 259 B-Transducins and sulfur assimilation in filamentous fungi and yeast, 73, 86-88 Transduction cascades DNA bending in transcription and, 593 Transferrin nonfusogenic pathogen vacuoles and, 427 Transfer RNA (tRNA) eubacterial carotenoid biosynthesis and, 631 intrabodies and, 274 trans-Golgi network nonfusogenic pathogen vacuoles and, 416, 418, 425, 427 Transketolases aldolases and, 304-5 overview, 286-87 Translation DNA bending in transcription and, 593 Transmembrane domain nonfusogenic pathogen vacuoles and, 431 Transposons Pseudomonas TOL plasmid catabolic operons and, 343-45 Tricholomopsis spp. organohalogen biosynthesis by Basidiomycetes and, 381 Tropism RNA virus fitness and, 162 Truncation rotaviruses and, 233 trx genes disulfide bonds and, 182, 186, 196-97 Trypanosoma cruzi nonfusogenic pathogen vacuoles and, 416 Trypanosomal protein coding transcription by RNA polymerase I cap structure, 468-69 discontinuous transcription, 465-67

introduction, 464

465-69

nuclear gene expression,

parasite life cycle, 464-65

polycistronic transcription of tandemly arrayed genes, 467 posttranscriptional control of mRNA abundance, 467-68

procyclic acidic repetitive protein, 476–80 promoters, 474–77 protein-coding gene expression by

α-amanitin-resistant RNA polymerase, 471 RNA polymerases in trypanosomes, 468-80

rRNA, 471-72, 474-76 VSG gene transcription units, 473-80

Trypsin nonfusogenic pathogen vacuoles and, 419 rotaviruses and, 239, 244

ts mutants rotaviruses and, 229-31, 234-39

and sulfur assimilation in filamentous fungi and yeast, 83

tsp genes eubacterial carotenoid biosynthesis and, 637, 639-40

Tumor necrosis factor (TNF) alphavirus and, 574–75 intrabodies and, 267

TUNEL assay alphavirus and, 580

Turkey tail organohalogen biosynthesis by Basidiomycetes and, 377

Two-component system cell-cell communication in Gram-positive bacteria and, 527

Tyrosine disulfide bonds and, 181

## U

U937 cells nonfusogenic pathogen vacuoles and, 422

Ubiquinone eubacterial carotenoid biosynthesis and, 631

organohalogen biosynthesis by Basidiomycetes and, 377-78

Ulcerative colitis

mucosal antigen-antibody interactions and, 326 Ultraviolet (UV) resistance Deinococcus radiodurans and, 203

Unfoldase

disulfide bonds and, 192 Upper operon

Pseudomonas TOL plasmid catabolic operons and, 341–42, 346, 363

## V

Vaccines

mucosal antigen-antibody interactions and, 312, 316, 330–32

nucleic acid-based intrabodies and, 258 RNA virus fitness and, 160, 168

rotaviruses and, 242 Vacuoles

acidic digestive

Plasmodium hemoglobin

degradation and, 97,

100-2, 108-10 nonfusogenic pathogen, 415-49

Valine disulfide bonds and, 181, 192, 194

Valleys fitness

> RNA virus fitness and, 157-64

Variable domains intrabodies and, 259-60 Variant surface glycoprotein

(VSG) expression sites trypanosomal protein coding genes and, 463-64, 473-80

Variation RNA virus fitness and, 154-57 Vectors

mucosal antigen-antibody interactions and, 312

RNA virus fitness and, 164 Vesicular stomatitis virus (VSV) nonfusogenic pathogen vacuoles and, 427

RNA virus fitness and, 155, 159-60, 163-64 Vibrio alginolyticus disulfide bonds and, 187

Vibrio cholerae disulfide bonds and, 187 mucosal antigen-antibody interactions and, 317 Vicinal diols

enantiopure epoxides and, 491 Vif protein intrabodies and, 261-62

intrabodies and, 261-62 Virions

intrabodies and, 261-63, 273 rotaviruses and, 227, 238, 246 Viroids

RNA virus fitness and, 153 Virulence factors

cell-cell communication in Gram-positive bacteria and, 527, 544-47 nonfusogenic pathogen

vacuoles and, 432–33

Viruses

intrabodies and, 257-61, 265-76

mucosal antigen-antibody interactions and, 311, 314, 316–22, 331

RNA

mutations and, 151-69 rotaviruses, 225-50

VP proteins intrabodies and, 261–62 RNA virus fitness and, 167 rotaviruses and, 226–27, 231,

238, 242, 244-46, 248-49

## W

Whorls

membrane nonfusogenic pathogen vacuoles and, 422

Wild type disulfide bonds and, 194 RNA virus fitness and, 157-58 rotaviruses and, 229, 235-36

## X

Xanthobacter sp.

enantiopure epoxides and, 497-98, 516

Xanthophylls

eubacterial carotenoid biosynthesis and, 629, 632–34, 636–37, 641, 645, 649

Xenobiotic pollutants organohalogen biosynthesis by

Basidiomycetes and, 375
Xenopus laevis

DNA bending in transcription and, 600, 609 DNA replication in yeast and, 130, 132

and sulfur assimilation in filamentous fungi and yeast, 78 Xenorhabdus spp. Photorhabdus spp. and cell surface properties, 65-67 crystalline protein genes, 56-57 DNA relatedness studies, 50, DNA transfer into, 57 extracellular enzymes, 56 fimbriae, 66-67 flagella, 66-67 gene characterization, 53-57 glycocalyx, 66-67 introduction, 47-50 low temperature in gene induction, 54-55 lux genes, 55-56 maltose metabolism, 55

molecular biology, 53-57

outer membrane proteins,

pathogenicity, 57-60

53-54, 66

phase variation, 60-65 phylogenic studies with 16s rRNA analyses, 52-53 taxonomic studies, 50-51

Xerocomus spp. organohalogen biosynthesis by Basidiomycetes and, 380

Xerula spp. organohalogen biosynthesis by Basidiomycetes and, 381

xpr genes cell-cell communication in Gram-positive bacteria and, 545

Xylenes
Pseudomonas TOL plasmid
catabolic operons and,
341–42, 345–46

Xyl proteins Pseudomonas TOL plasmid catabolic operons and, 341–42, 346–50, 354–62, 366

XyPs gene DNA bending in transcription and, 612

### Y

Yeasts
DNA replication and,
125-35
filamentous
sulfur assimiliation and,
73-94
intrabodies and, 259

## Z

Zeaxanthin
eubacterial carotenoid
biosynthesis and, 641,
645
Zinc-finger-like domain
intrabodies and, 272
Zymomonus mobilis
aldolases and, 300
eubacterial carotenoid
biosynthesis and, 652
Zymosan
nonfusogenic pathogen
vacuoles and, 438



